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New Digital Service Pricing

The Impact of Price-Setting Practices on
Market Performance and Pricing Power

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Abstract

This thesis examines the concept of new digital service pricing from a theoretical and an empirical point of view. Theoretically the topic was approached by summarizing materials in pricing frameworks from 1950 until 2016 to be applied for a model that may assist managers making pricing decisions for new digital services. The model consist of four parts representing the identification of: Value creation and value drivers, market strategy and corporate objectives, the competitive price range and lastly pricing strategy in the form of a scheduled set of final prices with the objective to maximize total discounted lifetime profits.

The starting point for the empirical study was to adopt the conceptual and measurement model by Ingenbleek et al. (2013) which was modified to the needs of digital services. A new scale is developed for cost-informed pricing while the scales for relative cost and relative price are modified to better suit pricing research in the digital services industry. Upon testing the conceptual framework, suggestions for further modifications are proposed. Most notably, a new construct for market potential should be included. Further issues not currently covered by the framework are value transparency and the more complex structure of the final set of prices, as opposed to the study of a final single price point. A recommendation is also made for the reimagination of the outcome variables to better approximate total discounted lifetime profits.

The proposed effects had to be studied in an exploratory manner as a cause of the small sample obtained (N=20). Careful support is given to the proposition of value-informed pricing having a positive effect on market performance. Higher use of value-informed pricing also seem to increase the variance in relative price, which leads to the hypothesis that a construct for market potential should be included in the conceptual framework. Careful support is also found for the proposition that the negative impact of cost-informed pricing on relative price is larger when relative service advantage is high. Competitive intensity might affect market performance negatively, while the effect on relative price was inconclusive.

Keywords Pricing, Digital, Price-setting practice, New service pricing, best-practice

Table of Contents

1	Introduction	5
1.1	Research Questions and Objectives	7
1.2	Structure of the Thesis	8
1.3	Terminology	9
2	Literature Review	10
2.1	Value Creation and Value Drivers	11
2.2	Corporate Objectives and Strategy	15
2.3	The Competitive Price Range	18
2.4	Pricing Strategy	21
3	Methods.....	27
3.1	Survey as a Research Method.....	27
3.2	Construct and Scale Development	28
3.3	Methods of Statistical Analysis.....	29
3.3.1	Exploratory Factor Analysis	29
3.3.2	Confirmatory Factor Analysis.....	30
3.3.3	Very-Simple-Structure.....	31
3.3.4	Reliability Tests	32
4	Survey Design	33
4.1	Construct Development.....	33
4.2	Scale and Item Development.....	36
4.3	Survey Testing	41
5	Propositions	42
6	Results	44
6.1	Description of Sample	44
6.2	Construct Validity and Scale Reliability	45
6.3	Interpretation of Observable Effects	53
6.4	Further Exploratory Findings	57
7	Discussion.....	59
7.1	Managerial Implications	62
7.2	Further Research Topics.....	62
7.3	Limitations, Validity, and Reliability.....	63
	References	64
	Appendix A: Scale Items	71

List of Figures

Figure 1. New Digital Service Pricing Model	11
Figure 2. Economic Value	13
Figure 3. The SBIFT Model (Iveroeth et al. 2013).....	15
Figure 4. Price Range for Positively and Negatively Differentiated Offerings.....	20
Figure 5. Conceptual Framework (Ingenbleek et al. 2013)	34
Figure 6. VSS Analysis Graphical Output.....	45
Figure 7. Value-Informed Pricing on Market Performance.....	53
Figure 8. Cost-Informed Pricing and Relative Cost on Market Performance.....	54
Figure 9. Value-Informed Pricing and Relative Service Advantage on Relative Price.....	54
Figure 10. Cost-Informed Pricing and Relative Service Advantage on Relative Price	55
Figure 11. Competitive Intensity on Relative Price.....	56
Figure 12. Competitive Intensity on Market Performance	56
Figure 13. Relative cost on Relative Price.....	57
Figure 14. Relative Service advantage and Relative Price on Market Performance	58

List of Tables

Table 1: Pricing Literature Mainly Utilized for the New Digital Service Pricing Model	10
Table 2: A Taxonomy of Pricing Strategies (Dixit et al. 2008, based on Tellis 1986).....	23
Table 3: Definitions of Price-Setting Practices (adapted from Ingenbleek et al. 2003)	35
Table 4: EFA Factor-Loadings, All Items Included	46
Table 5: EFA Factor-Loadings of Items Related to Price-Setting Practices	47
Table 6: Purified EFA Factor-Loadings Related to Price-Setting Practices.....	48
Table 7: Factor Loadings Not Related to Price-Setting Practices.....	48
Table 8: Factor-Loadings of Final Item Structure	49
Table 9: Two Factor CFA Results	50
Table 10: Properties of Purified Measures.....	51
Table 11: Correlation Matrix of Purified Measures.....	51
Table 12: Chi-Square Difference Results	52

1 Introduction

When launching a new product or service, pricing is a highly complex decision puzzling top management around the world (Ingenbleek et al. 2013; Dean 1976). Too often, the management responsible for the decision does not have the required expertise to take these decisions, nor the money to hire pricing consultants as expensive as they are rare (Jensen 2013). Jensen states that an annual pricing conference in the U.S. typically only draws 30-40 people. In Europe, the EADA pricing research center was the first of its kind in history and established as late as 2011. Traditionally, new product pricing has been viewed as the choice between market skimming and market penetration pricing. Despite the call for more complex approaches, papers on the subject have been few and far between (Ingenbleek 2013). As a result of this lack of pricing knowledge in companies today prices may often be set too low. Urbany (2001) shows that managers might routinely set prices too low in order to aggressively buy market share or because of fear of being overpriced as compared to competitors. This behavior will too often lead to damaging industry wide price cuts that hurt the profitability of all participants in price-wars. Marn et al. (2003) state that, in their experience, 80-90 % of new offerings are priced too low. They also argue that underpricing is a far larger problem than overpricing since high prices can be cut while low prices are cemented in customer's minds as reference prices, making it hard or impossible to raise prices by much. The foregone profits of such mistakes are substantial in many industries. Cressman (1999) noticed an alarming absence of value-informed approaches in the pricing taxonomy by Noble and Grucca (1999), criticizing the internal focus of these pricing practices and called for action in order to educate managers on more modern value-informed approaches. Also, even if new product advantage over competition is considered one of the strongest predictors of new product performance (Henard & Szymanski 2001), a recent study has shown evidence that wrongful pricing practices can erode the effect of a significant product advantage (Ingenbleek et al. 2013). This shows us evidence that all the hard work put into product development might be lost if the wrong pricing decisions are made.

The Director of EADA's Pricing Center Manu Carricano does however note several hints at the growing importance of pricing in organizations (EADA View). First, Carricano notes that pricing seems to have developed an entirely new function within organizations in the last 10-15 years. It is also more and more common to see Chief Pricing Officers in organizations. Second, Carricano cites research stating that a 1 % improvement in price has an impact on profit in the range 8-11 %, while a 1 % improvement in cost reduction only

increases profits by 3-7 %. Value improvements of 1 % only impact profits by 2 %. In today's digital, global and fast-paced competitive environment, firms now more than ever feel the pressure to act on these opportunities (EADA View). There is a clear correlation between the rising importance of pricing and the rise of the internet, as the internet provided the infrastructure needed for full globalization and greater price transparency (Homburg et al. 2009; Marn et al. 2003). In Europe, the introduction of a common currency has also contributed to increased price transparency between countries. With this background in mind, we cannot expect the importance of good pricing principles to go away anytime soon.

One issue with pricing is that price itself represents more than one thing, and is thus complex. Price in its most basic form is what the customer pays, while price from a more customer oriented view is what values the customer has to give up in order to get the benefits of the offer (Lauterborn 1990). This can include not only money, but also time spent searching for information, retrieving the product or a conscious cost in form of guilt. Dean calls this cost for the customer (Dean, 1976). Deciding what price to set is also not an isolated decision. Nowadays it is well known that prospects can use price as an indicator of quality (Rao, Monroe, 1989). The price also has a designated spot in the traditional marketing mix, and it is recommended to be set in harmony with the other parts of the marketing mix. Armstrong and Kotler (2006) states that a price will ultimately be set between a price ceiling, above which there is no demand for the product, and a price floor, below which the company cannot turn a profit. In between these points, the price will vary as a cause of marketing strategy, objectives and mix, the nature of the market and demand, competitors' strategies and prices as well as "a number of internal and external factors". The establishment of this competitive price range is supported by many researchers (e.g. Monroe, 2003; Nagle, Hogan, Zale, 2016; Marn et al., 2003; Jensen, 2013). Much like a stock price reflects all publicly available information on a company, the price a company put on its product reflects on the company's strategy as well as its communicated quality, among other things. Hence, it is important to set a price consistent with the rest of the company's objectives (Dean 1973; Ingenbleek et al. 2013; Nagle, Hogan, Zale, 2016).

Even if price is a component of the marketing strategy as a whole, it is also a part of the marketing mix that has some distinct features that should be highlighted. Homburg et al. (2009) points out four distinct features of pricing as part of the marketing mix. First, they point out that pricing decisions can be implemented relatively quickly as compared to other instruments in the marketing mix. Second, they point out that pricing decisions are "Hardly

reversible”. By this they mean that a fixed price works as a point of reference for customers and prospects, it is against this point of reference later price changes are evaluated. Here, Marn et al. (2003) argue that this effect is stronger when trying to raise prices, as opposed to lowering them. This also falls in line with prospect theory, which states that people experience losses as worse than corresponding gains (Kahnemann 2012). Lastly, they point out that pricing decisions have a major impact since the price set is what customers are giving up to get the value of the product or service. Accordingly, pricing decisions also have a fast impact leading to rapid customer responses in many markets.

Summarized, we can see that pricing has a major impact on the profitability of firms. Price decisions and responses to price introductions and changes are also relatively rapid as opposed to other parts of the marketing mix. Though holistic research on pricing frameworks has been scarce and simplistic, this thesis will try to find common ground between both academics and practitioners in order to present a conceptual model to analyze new digital service pricing. In the empirical part, I am adopting the conceptual framework and scales of Ingenbleek et al. (2013) which are modified to better suit pricing research in the digital services industry. A completely new scale is developed suitable for the analyzing of digital service pricing, while several other items are modified to suit pricing research in this industry. The thesis ends with testing of propositions and other exploratory results before concluding with a discussion of these results.

1.1 Research Questions and Objectives

This thesis aims to find consensus among academics and practitioners in order to find a conceptual framework suitable for new digital service pricing. The empirical part of the thesis aims to develop scales and items suitable for pricing research in the digital service industry and to test the viability of proposed effects in an exploratory manner. Based on the findings in this thesis, suggestions for future research are made. Accordingly, this thesis aims to answer the following questions:

1. What insights for new digital service pricing are there to be gained from the pricing literature?
2. How should the conceptual framework by Ingenbleek et al. (2013) be changed to be more suitable for research on digital service pricing?
3. What best-practices can be identified?

1.2 Structure of the Thesis

The theoretical part of the thesis examined holistic pricing papers and books on pricing from 1950 to today. As the aim of the study is to find consensus among academics as well as practitioners, common themes were identified and structured in a new pricing conceptual model. The empirical part utilizes the conceptual framework developed by Ingenbleek et al. (2013) and modifies the scales used to better suit pricing research in the digital services industry. The new measures are tested using exploratory factor analysis and reliability tests. Lastly, proposed effects are tested in an exploratory manner.

The thesis starts with a literature review, structured after the final new digital service pricing model. Thereafter, in the methods section, research methods and statistical methods are presented on a theoretical level. The thesis continues with a chapter on survey design, which includes construct and scale development building on the conceptual framework by Ingenbleek et al. (2013). Six proposed effects are described in the propositions section before the results are presented. The thesis ends with a discussion on the contributions, limitations, and suggestions for further research.

1.3 Terminology

Reference price: The benchmark price buyers refer to when evaluating offered prices (Armstrong & Kotler 2006; De Mayer & Estelami 2013; Erdem et al. 2010).

Reference value: The price of the next best offer (Nagle, Hogan, and Zale, 2016).

Pricing Strategy: “a set of alternative prices (or price schedules) that aim at profit maximization within a planning period in response to a given scenario.” (Tellis, 1986) An alternative view is the traditional differentiation between skimming and penetration pricing strategies (Dean, 1976). In this thesis, the definition by Tellis (1986) is used.

Price-setting practice: “the set of activities executed by an organization’s managers that lead to a price decision” (Ingenbleek et al., 2003).

Competitive Price Range: The pricing choice space between a price ceiling and a price floor. The term competitive price range, or range of competitive prices, derives from Dean (1976). Other terms used are price discretion (Monroe, 2003) and price window (Nagle, Hogan, and Zale, 2016).

Value Transparency: The degree to which prospects are aware of and understand the differential value delivered. (Anderson et al., 2010)

Digital Service: “Any activity or benefit that one party can give to another, that is, essentially intangible and does not result in the ownership of anything.” (Kotler and Armstrong, 2006) Additionally, the definition in this thesis requires the digital service to have zero variable cost. The digital service can still incur stepwise fixed cost as shown by Huang and Sundararajan (2011).

2 Literature Review

In the pricing literature reviewed, ten pricing frameworks were mainly utilized. The oldest was Oxenfeldt's 1960 framework with the most recent being the updated 2016 framework of Nagle, Hogan and Zale. Reviewing common themes in these ten frameworks, as well as other supporting literature, a summarized model for analyzing new digital service pricing consisting of four broad steps was developed. The ten papers and books laying the groundwork for the new model in this thesis are shown in table 1.

Table 1. Pricing Literature Mainly Utilized for the New Digital Service Pricing Model.

Author(s)	Title	Year
Oxenfeldt	Multi-stage approach to pricing	1960
Welsh	A planned approach to new product pricing	1968
Dean	Pricing policies for new products	1976
Monroe	Pricing: Making Profitable Decisions	2003
Marn et al.	Pricing New Products	2003
Dixit et al.	A taxonomy of information technology-enhanced pricing strategies	2008
Anderson et al.	Why the highest price isn't the best price	2010
Deeter & Jung	Software as a Service Pricing Strategies	2013
Iveroth et al.	How to differentiate by price: Proposal for a five-dimensional model	2013
Nagle et al.	The Strategy and Tactics of Pricing	2016

Among the themes recognized early on there was the need to price over the whole life-cycle and the need to take competitors' reactions into consideration (e.g. Dean, 1976; Welsh, 1968), while formal value-based approaches to pricing, on which there was consistent approval, was introduced about thirty years later. This section will present the conceptual new digital service pricing model in figure 1 by going over the steps of the conceptual model one by one. It is, however, important to recognize that pricing should take a holistic approach where each part interact with one and another (e.g. Nagle, Hogan, and Zale, 2016; Dean, 1976), instead of a pure stepwise approach. For educational purposes, the conceptual model is still presented as a stepwise process with step-order based on what lays the foundation for the next step.

Figure 1. New Digital Service Pricing Model



The model starts by identifying how a company creates value through its service and how the pricing should be structured in order to best capture this value. Then the company's strategy for the market and its impact on pricing is taken into consideration along with price and value communication strategies. Next, the competitive price range is identified, which is the range of prices between the lowest and highest possible price and different scenarios in this range are evaluated. Lastly, the company arrives at its pricing strategy, which is the final set of prices to be offered over the lifecycle. For digital services, the same underlying principles comply, which is considered important for the purpose of this thesis. Key differences between digital services, and ordinary products and services are the ease of versioning the options of pricing models available.

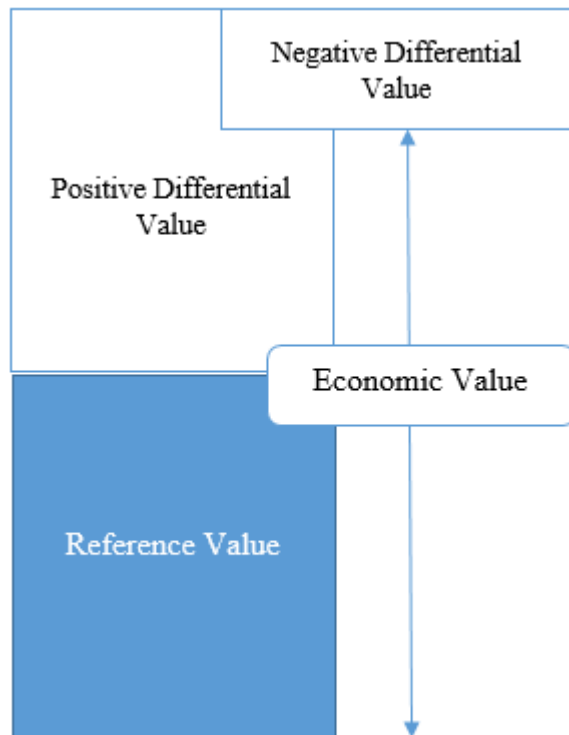
2.1 Value Creation and Value Drivers

The first step of any pricing decision is to truly understand how a company's service is creating value for its customers (Nagle, Hogan, Zale, 2016; Deeter and Jung, 2013). Part of this understanding of value creation is to identify value drivers. Is the service generating time savings, cost savings, more sales leads or reduced risk? These are examples of monetary value drivers, which are already quantifiable, and hence, fairly easy to estimate.

Psychological value drivers, such as satisfaction and ease of use, are much harder to quantify but just as important. There are many methods available for estimating psychological value, of which conjoint analysis is the most widely used (Green et al., 2001). Conjoint analysis allow the researcher to make trade-offs between service attributes (Green et al., 2001). The results can be useful for pricing purposes as well as research and development. These two functions of a company should follow in parallel as both are interested in what service attributes drive customer value. There is no need for R&D to develop features that customers do not value (Nagle, Hogan, Zale, 2016). Anderson et al. (2010) point out the benefits of involving customers in the development process in order to better align service features with those that customers are willing to pay for. Accordingly, pricing research can be a very effective tool for identifying development opportunities as it creates a direct link between features and customer value. Marn et al. (2003) also point out the importance of in depth interviews with the customers or prospects in order to find potential hidden values that would not be visible with formalized approaches for analysis alone.

When the drivers behind value creation have been identified, they need to be quantified. Nagle, Hogan and Zale (2016) recommend the use of the term economic value, from economics, to have a unified and distinctive measure of value. The economic value is interpreted as the maximum price a purchaser would be willing to pay. It is based on two other types of values: Reference value and differential value. The reference value is the price of the next best offer. Differential value, on the other hand, is the positive or negative value of any features or attributes added or missing as compared to the reference offer. The economic value is then calculated as the price of the next best offer plus positive differential value minus negative differential value. Anderson et al. (2010) agree with this approach assigning a whole step in his approach to the adequate identification of the next best offer, since the use of total customer value can often be misleading and lead to overpricing. This view is supported by Marn et al. (2003) as they state that the optimal price can be less than the maximum value for a number of different reasons. A real world example of this is Spotify. What is the value of a having a music collection that large on every device? For obvious reasons, a total customer value approach was not appropriate. Instead, they identified the average spend on CD's and doubled that number for their premium service (Spotify for Artists). Figure 2 illustrate the calculation of economic value.

Figure 2. Economic Value



The economic value estimated here should not be interpreted as the final price. It is more of an agreement as to what value should be measured throughout the price-setting processes. There are many more considerations to be made before a final price optimal price can be estimated.

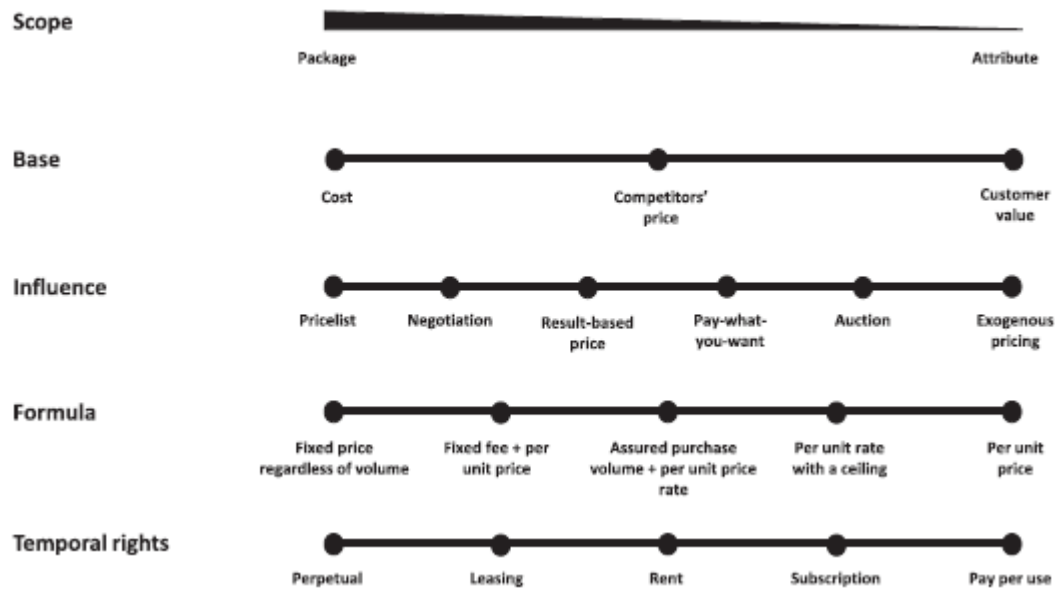
Once the value to the customers has been established on a general level, companies should research the possibilities for segmentation. Note that segmentation should not be done on arbitrary variables, but rather on variables that directly affect purchase motivation (Nagle, Hogan, Zale, 2016) or those that are most important to the buyer (Deeter & Jung, 2013) and hence perceived value. Segmenting on these types of variables, different values can be extracted from the segments and present an opportunity to price discriminate (Deeter and Jung, 2013). Nagle, Hogan and Zale (2016) call this value-based segmentation. As the name indicates, companies should strive to segment on the variables where the service delivers value for the customer. For example, a 3D visualization service for architects probably would have higher value for a large company working with large deals than it would for students of architecture that might get no income from the service at all. Value-based segmentation requires careful thought in order to appropriately determine the correct discriminating value drivers for each segment. Choosing the wrong value driver will ultimately lead to the company focusing on delivering the wrong value. Deeter and Jung (2013) identify three

common criteria for segmentation equaling those of Tellis (1986) characteristics of consumers (in determining pricing strategy to pursue): differences in search costs, differences in reservation prices (willingness-to-pay) and special transaction costs. In determining the most appropriate segments to focus on, companies should also focus on their operational advantages and disadvantages (Nagle, Hogan, and Zale, 2016). Again emphasizing the holistic approach to pricing, companies should ask themselves what segments they can serve more efficiently than other segments (Oxenfeldt, 1960; Nagle, Hogan, Zale, 2016). While the question is important, further exploration is beyond the scope of this thesis. For a full six-step analysis for value-based segmentation, see Nagle, Hogan, and Zale (2016).

The last step of the segmentation procedure is to identify what Nagle, Hogan, and Zale (2016) call metrics, fences and price-offer configuration. This can be understood to be equivalent to that other researchers call pricing models. Metrics are the measure for how customers receive and pay for value (e.g. fare per km for taxi rides) while fences are what rules customers have to follow or fulfill in order to qualify for a discount compared to higher priced segments (volume or student discounts). Price-offer configuration is a literal description of bundling and unbundling options of features in order to best serve customers service requirements and willingness to pay. Iveroth et al. (2013) proposed a five-dimensional model with the aim of helping companies to differentiate by price through pricing models. The model's five dimensions are scope, base, influence, formula and temporal rights. This abbreviates to simply the SBIFT model.

The first dimension, scope, equals the price-offer configuration of Nagle, Hogan, and Zale (2016), or the granularity of the offer from a full bundled package to a pay-per-attribute model. The second dimension, base, refers to the competitive price range, or the choice to set a price close to the maximum or minimum realistic price or somewhere in-between. We will return to the competitive price-range later. Influence reflects the degree to who determines the final price, from a company determined price-list to pay-what-you-want-pricing or the occasional exogenous pricing, where price is out of influence from both seller and buyer (such as when it is tied to an index). The last two dimensions bear similarities with the earlier mentioned metrics by Nagle, Hogan, and Zale (2016). Formula is simply a description of how price is connected with volume, while temporal rights describe how long customers have the right to use the offering. Figure 3 describes the five-dimensional model by Iveroth et al. (2013).

Figure 3. The SBIFT Model (Iveroth et al. (2013)).



While going into more detail on the processes to arrive at an optimal pricing model is out of the scope of this thesis, it is deemed sufficient to state that companies can use these price modeling tools and concepts in order to experiment with different pricing models. The general goal should always be to identify pricing models where price aligns as closely as possible to the value received by the customer. The tools here incorporate all most common pricing models such as tiered and consumption models. The freemium pricing model is notably missing, since it is actually as much of a value communication tool as a pricing model. Hence, more information on the freemium pricing model will be presented in the section covering value communication.

2.2 Corporate Objectives and Strategy

Corporate objectives are very much dependent on the company strategy, and so should also pricing be (Dean, 1976; Nagle, Hogan, Zale, 2016; Anderson et al., 2010). The definition of corporate objectives should be understood as “what does the company want to accomplish in this segment”. The objective should not be just to “sell more”, instead rather more sophisticated objectives aimed at improving and maintaining profitability should be stated (Anderson et al., 2010; Nagle, Hogan, Zale, 2016). For example, companies might accept lower profits for a service if they think they can lock in customers for upsells to a more profitable segment. As with company strategy, pricing strategy should also be dependent on what competitive advantage the company has. The character of the service and the type of market the service is to be introduced also play a critical role in determining corporate

objectives. For example, entering a new market requires a different strategy than introducing an evolutionary service to an old market. Accordingly, different corporate objectives, and hence pricing guidelines, should be set (Anderson et al., 2010). Also in the traditional marketing mix, it is recommended that price should be aligned with the other elements of the marketing mix (Homburg et al., 2009; Oxenfeldt, 1960). The market potential also plays a crucial role in determining corporate objectives, as it sets the stage for the total collectable profits for the service and whether to pursue a relatively high or low price (Dean, 1976). The higher the market potential, the larger the threat from existing and potential competitors is as well. On the other hand, some companies do indeed have a competitive advantage through cost efficiency. This is the only way a company can motivate competing on price (Nagle, Hogan, Zale, 2016).

Once the company has clear objectives in line with the company strategy for continued profitability, there is one more dimension with which companies should align their objectives. The important question is; what is the differential value that is transparent to customers?” (Anderson et al., 2010) In other words, do the potential customers understand the differential value of the service? This dimension requires companies to formulate value communication strategies, should the differential value not be transparent. Some companies bringing cost-savings to the table offer their customers calculators that estimate potential cost-savings from the service based on the customers’ own data. Others spend money on educating the potential customers through advertising or other media (Dean, 1976). According to Nagle, Hogan, and Zale (2016), the value communication strategy is dependent on two dimensions; relative cost of search and type of benefits. Type of benefits can be economic or psychological, while relative cost of search can be high or low. Most digital services have high relative search costs, as users will often have to spend time using the service in order to realize at least some of its value, notably user experience (while some economic benefits can be proved with statistics). Services with high relative cost of search fall in the category of experience goods, and they can be especially tricky from a value communication point of view. As Shapiro put it in his 1983 paper on optimal pricing of experience goods: “...as buyers learn about the product, the demand curve shifts over time.” (Shapiro, 1983) Shapiro also show that a two-step pricing scheme is optimal when consumers underestimate the quality of a service good. Specifically, a low introductory price followed by a higher maintained price. Introductory offers have been common in the marketplace for a

long time, but only recently have the most special case of introductory offers been introduced to the marketplace – the freemium model.

Generally considered a pricing model (e.g. Deeter and Jung, 2013) it is also a value communication tool. The freemium model allows users to get acquainted with a version of the service with limited functionality for free, while prompting for upgrade to a paid premium version should the user wish full functionality (Shankarananda, 2015). There is indeed some magic with the word “free”. Shampan’er and Ariely showed in an experiment, having people to choose between two products, one cheap priced at one cent and one premium product priced at fourteen cents, that decreasing the price of both products with one cent to zero had an abnormally positive effect on how many people chose the now free product. The difference is in fact so large that decreasing the price to zero not only affects people’s perceived added value through the lower price, but in fact also seem to raise the valuation of the good itself (Shampan’er, Ariely 2007). Prospects might also be cautious because of the endowment effect, stating that out-of-pocket costs are viewed as losses while the opportunity cost of using a service is seen as a foregone gain (Thaler 1980). In prospect theory, this means that there will be a discount in the valuation of the foregone gains causing the out-of-pocket cost to be disproportionately large (Kahnemann, 2012).

While the freemium model has shown itself to work well for building market share and adoption, it is also a model that requires certain elements to be profitable. One of these elements is scale. Since freemium businesses often see their share of premium users as low as 2-5 % (Shankarananda, 2015), they must address a large market in order to gain profitability. The second element is service features, as companies deciding on a freemium model must strike a delicate balance between offering too much or too little in the free version. Offering too much could cannibalize on premium sales, since there would be no need to upgrade, while offering too little could slow down adoption or even drive customers away as they fail to see the true value of the service (Lee, Gupta, Kumar, 2013). Recently, more innovative models for pricing and value communication has come up such as paidmium, which allow users to experience applications first-hand but offer in-app purchases to build revenue (Shankararanda, 2015).

Summarized, companies can communicate value by educating customers through advertising, tools, or by allowing them to experience a full or limited version of the service first-hand for a specific or indefinite time. Understanding corporate objectives in line with

value transparency, company strategy, and market potential will help managers in determining what the best total profit-maximizing pricing strategy would be in the long term.

2.3 The Competitive Price Range

Once managers understand how its service drives customer value and what part of that value is transparent, the company strategy and objectives suitable for the market they are operating in, it is time to determine the range of realistic or possible prices. Research efforts have placed comparatively much effort on this stage, as it provides a natural starting point when companies think about what price to set (e.g. Ingenbleek et al., 2013; Marn et al., 2003; Dean, 1976; Monroe, 2003). The basic idea is to identify the possible range of prices between a price ceiling and a price floor. Monroe (2003) separates this identification into two steps. First, companies determine an initial competitive price range. Then, factors that shrink this range are identified, such as downward pressure from competitive factors and upwards pressure from corporate objectives or regulatory constraints. Besides identifying the maximum and minimum prices that create the boundaries for the competitive price range, companies should also identify reference price points in that range to better understand the competitive landscape (Jensen, 2013; Nagle, Hogan, Zale, 2016). A reference price is the benchmark price buyers refer to when evaluating offered prices (Arsmstrong & Kotler 2006; De Mayer & Estelami 2013; Erdem et al. 2010). All of these points, including price floor and ceiling, should be established separately for each segment (Nagle, Hogan, Zale, 2016).

The price ceiling is the maximum realistically obtainable price and is dependent on customers' perception of value delivered by the service (Ingenbleek et al., 2003; Dean, 1976). Based on the findings when the company first researched how the service creates value for its customers, they should now turn this value into the highest possible price above which there is no demand (Armstrong, Kotler, 2006). While this price may not be realistic for a variety of reasons, such as too low demand, customers buying power leaving or competitive forces, it ensures that all possible prices are thought of (Marn et al., 2003; Ingenbleek et al., 2003; Henard, Szymanski, 2001). As discussed earlier, value transparency is also a key factor that can put downwards pressure on the price ceiling.

The price floor, on the other hand, is the lowest possible price at which the company still will remain profitable. Though cost-informed pricing generally is considered bad practice as the sole form of pricing information (e.g. Heymann, 1980; Dean, 1976), it still holds an important role in determining the price floor (Nagle, Hogan, Zale, 2016; Marn et al., 2003).

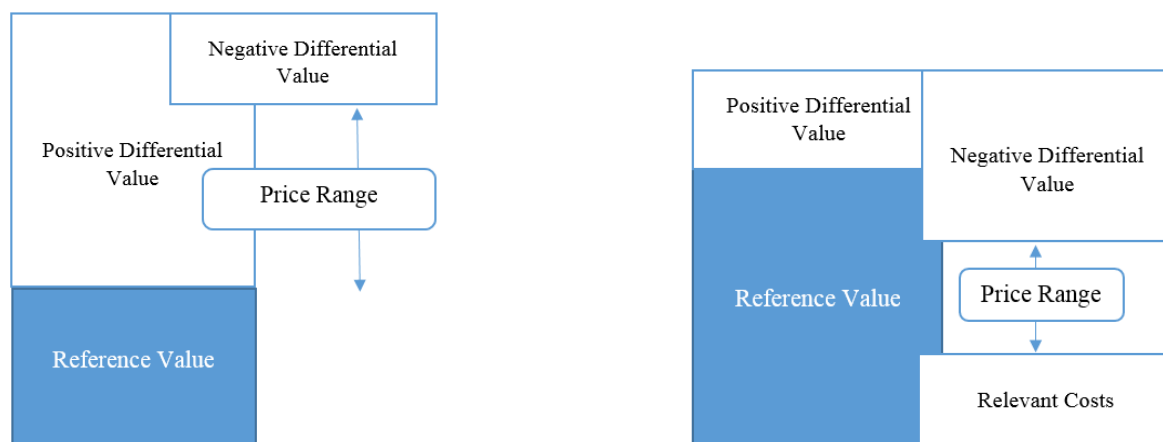
Determining an appropriate price floor is especially useful for “birth-control” of new services, as the company can estimate whether the service will generate at least minimum return on investment. As pointed out by Marn et al. (2003), companies still often overlook important costs when determining their price floor. For example, all research and development expenses should be included, also costs for incomplete projects as these will affect the minimum rate of return a company requires from all its services. Goodwill from acquisitions that lead directly to new services should also be accounted for. For digital services, determining a cost floor is especially difficult since their cost structure usually comprise of a large share of fixed costs. In order to get an accurate estimate of a cost floor, accurate estimates of volume are needed (Ingenbleek et al., 2003). This increases the ambiguity of the cost floor for digital services. Marn et al. (2003), Jensen (2013), and Dean (1976) recommend that several volume estimates are made for each price point, or that a sensitivity analysis is performed. This is also important so that the company later can make accurate price-volume trade-offs when determining the final set of prices (Nagle, Hogan, Zale, 2016).

It can also be effective to analyze the prices of competitors. Methods of competition-informed pricing have taken a lot of critique over the years as a cause of its simplistic structure (copy-pasting competitors’ prices), but used correctly it has been shown to give companies important knowledge of their competitive price range. Ingenbleek et al. (2013), show that competition-informed pricing practices can be useful in stable markets when the product advantage is high. Presumably, this is due to prices being set below prospects reference prices, which according to prospect theory should give a larger choice share to the new service or product (Kahnemann 2012). Ingenbleek et al. (2013) also show the benefit of competition-informed pricing in markets where the company’s relative product advantage is high and relative costs are low. The reason for this lies in numerical cognition literature. The authors explain that people make larger estimation mistakes when comparing a stack of 10 items against a stack of 100 items, as opposed to comparing a stack of 90 items against a stack of 100 items. Then, in the case when product advantage is high, and accordingly the price ceiling should be high, and the relative costs of the firm are low, and correspondingly a low price floor as well, companies might be better off focusing more on the price of the competition as opposed to their own cost in order to get a more accurate estimate of the price-ceiling through value informed pricing. Jensen (2013) on the other hand stresses the value of the information companies can get from competitors’ sales and prices. Much like conjoint

analysis, Jensen recommends that companies do a thorough mapping of competitors' attributes and prices in order to get a complete view of the competitive landscape. By objectively comparing your product to those of your direct and indirect competitors, you can often get a decent sense of what your prospects value and are ready to pay. With all these additional price points established, the competitive price range of the new product should now feel more tangible as to what is expected at each price point.

Nagle, Hogan, and Zale (2016) rely on economic and differentiation value in order to establish the competitive price range. They identify the price ceiling similarly to other models, equal to the economic value. The approach to the price floor is split into two possibilities. If the product is positively differentiated, the price floor is the reference price of the next best offering. It is only if the service is negatively differentiated that the price floor is established by relevant costs. The approach is illustrated in figure 4.

Figure 4. Price Range for Positively and Negatively Differentiated Offerings.



The authors stress the importance of allowing negatively differentiated services to keep their low prices in order to maintain a stable market. Engaging in a pricing war with these services would hurt profits for the whole industry. If a negatively differentiated service is faced with a cut in a competitor's price, they are wise to respond as this is the only option they have (at least in the short term). Competitors' reactions in general is a topic that has been present in many pricing models since the beginning (Welsh, 1968; Dean, 1976) and has continued to play an important role until this day (Marn et al., 2003; Nagle, Hogan, Zale, 2016) since pricing should be performed over the whole life-cycle. A large risk with high competitive intensity is the risk of price war, where total industry profits typically fall and all

participants loose. This is negative-sum competition, which should be avoided. Another example would be war of nations, where all participants end up losing resources. Negative-sum competition is distinctive from positive-sum competition, such as sports or research and development efforts, where all participants have something to gain. If nothing else, experience is gained for the next time. When facing the threat of negative-sum competition, such as price wars, managers should carefully consider the consequences of their actions as the negative consequences could often be irreversible. Accordingly, setting the price of a new service, managers should not necessarily try to outprice their competitor, if their competitor has a cost advantage that is non-achievable for the company itself (Nagle, Hogan, Zale, 2016). Should the introduced service present a significant threat to the competitor, they would probably follow through on the price-cut in order to protect market share. That is, if this price-cut would be less costly than the cost of losing market share. Chen and MacMillan (1992) showed that competitors are indeed more likely to respond and to respond quickly to price moves as compared to other competitive moves. Their findings are well in line with later advocates of thoughtful competitive pricing strategies; avoid initiating an aggressive price move if you can attract customers with any other approach.

2.4 Pricing Strategy

Once the competitive price range has been identified, companies can evaluate what pricing strategy to pursue. Tellis (1986) defines a pricing strategy as “a set of alternative prices (or price schedules) that aim at profit maximization within a planning period in response to a given scenario.” This can be understood as how to price the product over its lifetime, including planned discounts, in order to maximize profits. This definition is chosen over the classical definition that simply splits the competitive price range into skimming pricing, neutral pricing and penetration pricing (e.g. Dean, 1976, Marn et al., 2003; Nagle, Hogan, Zale, 2016) since it includes tactics, such as discounts or bundling, for strategic use. In the classical definition, skimming pricing targets the segment with the highest reference price first and then subsequently lowers the price to capture the value of other segments with lower reference prices (Dean, 1976; Homburg et al., 2009). Penetration pricing targets faster market adoption at a lower price (Ingenbleek et al. 2013; Armstrong and Kotler, 2006). Neutral pricing means striking a careful balance between benefits and price in line with the competition (Nagle, Hogan, Zale, 2016; Jensen, 2013). This classical definition nicely explains what is sought at different points in the competitive price range, but has also

received criticism for being overly simplistic (Ingenbleek et al., 2013). For example, as stated before, it does not consider tactics. Several authors state that it is crucial that pricing tactics motivate customers to take action that benefit the seller and not only to “win the same business at a lower price” (Anderson et al., 2010; Nagle, Hogan, Zale, 2016; Marn et al., 2003). For example, one common way for digital services to do this is by giving customers a discount for inviting a friend (e.g. Datacamp, Uber). Again, pricing is a tool that should be used in alignment with other tools at the company’s disposal. It is also crucial that discounts are planned and managed, and not applied on an ad-hoc basis as such practices could quickly erode profits (Nagle, Hogan, Zale, 2016) and sabotage the reference price of the service (Marn et al., 2003). Notably, Tellis (1986) taxonomy of pricing strategies include the classical market penetration and market skimming pricing strategies, and also adds other options.

According to Tellis (1986), the best suitable pricing strategy appears when shared economies, or cross-subsidies, are observed. Tellis offers the following explanation for a shared economy: “In a shared economy, one consumer segment or product bears more of the average costs than another, but the average price still reflects cost plus acceptable profit.” Accordingly, pricing strategies are classified into three groups depending on which factor heterogeneity is present. These groups are differential pricing strategies, where consumer heterogeneity is utilized, competitive pricing strategies, which is based on heterogeneity in the competitive positions of firms, and product line pricing strategies, which utilize the heterogeneity in a firms related set of products. Taking into account the characteristics of consumers, that some have high search cost, low reservation price or special transaction costs; a nine-cell matrix of pricing strategies is obtained. Even if Tellis taxonomy is dated, its underlying fundamentals of shared economies has proven to be applicable to later pricing strategies such as dynamic pricing and online auctions as well (Harmon et al., 2009; Dixit et al., 2008). The taxonomy is normative, but the author states that real world problems are more complex. Hence, joint effects of shared economies may occur at the same time and lead a company to pursue a combination of the pricing strategies listed. The rise of IT-enabled solutions, however, has reduced search costs and transactions costs while enabling more efficient segmentation of consumer heterogeneity in willingness to pay (Dixit et al., 2008). As such, it makes sense to present the pricing strategies only in the three dimensions representing company objectives, while only keeping the consumer characteristics in mind.

Dixit et al. (2008) presents an updated taxonomy, including IT-enhanced pricing strategies, in this way. Their taxonomy can be found in Table 2.

Table 2. A Taxonomy of Pricing Strategies (Dixit et al., 2008, based on Tellis, 1986).

Differential Pricing Strategies	Competitive Pricing Strategies	Product Line Pricing Strategies
Random Discounting	Price Signaling	Price Bundling
Skimming Pricing	Penetration Pricing	Premium Pricing
Second Market Discounting	Automated Pricing	Complimentary Pricing
Auctions/Reverse Auctions		Product and Price Customization
Revenue Management		

While a full examination of pricing strategies is beyond the scope of the thesis, a few examples are in place. Gaming companies, for instance, often use random discounting for their in-app purchases. Random discounting is like the name suggest the act of randomly and infrequently discounting the price in order to capture the additional value of consumers with a lower reservation price and lower search costs while keeping the value of consumers with a higher reservation price and higher search costs (Tellis 1986). Different types of service bundling strategies are a prime example of the tiered pricing models, where different versions of a service can be sold to customer segments with different needs and willingness-to-pay (Deeter and Jung, 2013). While the taxonomy is by no means comprehensive, it is a useful indication of what methods are available and stresses the importance of planning for discounts as a strategic option. Product-service line pricing strategies (Dixit et al., 2008) are also easily implemented for digital services, since versions of the service can have features added or removed with relative ease and fast scalability.

The final set of prices should be well aligned with the company strategy and objectives, while also considering price-volume trade-offs as well as the customers' response (Nagle, Hogan, Zale, 2016). For example, Amazon.com had a company strategy that emphasized fast growth so that a considerable market share could be achieved and allow the company to become top-of-mind for consumers before any competitor could copy their business model. Even though the service created considerable value, a low price was motivated by these strategic goals that maximized expected long-term profits.

The price-volume trade-off is well established in economic theory; marginal revenue should be equal to marginal cost in order to maximize profits. The problem is that these

numbers are usually hard to establish in reality. Hence, it has been proposed that firms use a more practical set of questions in order to necessarily accurately estimate the price-volume trade-off. For a price increase, firms should ask themselves how much volume they can afford to lose before the price increase becomes unprofitable, and vice versa for a price decrease (Nagle, Hogan, Zale, 2016). Others recommend demand estimation at several points in the price range and a sensitivity analysis (Dean, 1976; Marn et al., 2003). The consensus is that the price-volume trade-off must be taken into account by any means available in order to find a profit maximizing trade-off. The magnitude of these trade-offs will of course be dependent on the sellers margins. Digital services notably often have high margins, and hence often find themselves at an advantage lowering prices since less volume is needed to make up for the price cut (Huang, Sundararajan, 2016; Nagle, Hogan, Zale, 2016).

The last issue to be considered is the customers' response to the new set of prices and how to manage the price expectations of customers (Anderson et al., 2010; Nagle, Hogan, Zale, 2016). There is wide range of research available on behavioral pricing and how prices are perceived. While classical pricing research aims at developing normative models, behavioral pricing strives to explain observed behaviors with descriptive models (Thaler, 1980). In its essence, classical pricing theory does not account for anything else besides price and product characteristics (Thaler, 1985), while there are a range of proven biases that have been shown to affect purchase behavior. Such biases are for example framing, mental accounting and anchoring.

Two key factors that are affecting consumer behavior are price expectations and perceived fairness (Homburg et al. 2009). Thaler (1985) demonstrates this effect through a survey in which the respondents are to imagine themselves lying on a beach on a hot day, wishing to have a cold beer in their hand. A friend gets up to make a phone call and offers to buy a beer on the way back. Here, the survey splits into two scenarios. In the first, the beer is bought from a grocery store, and in the second it is bought from a fancy beach resort hotel. The results from this survey where in Thaler's own words "dramatic". At the grocery store, the median price given was \$1.50 while the median given at the beach resort hotel was as high as \$2.65. Note that according to classical pricing theory atmosphere should have no impact on pricing, yet it does – as shown by behavioral pricing. In the case of digital services, there is no atmosphere to be taken into account, but the results of the survey are still applicable by thinking of services as if they are common or premium. In the beach example, the fair price of the beach resort was higher than that of the grocery store since the resort has

much higher costs, both for personnel and for making the hotel bar fancy enough for a beach resort hotel. Hence, the perceived costs affect the perceived fair price by consumers (Homburg et al. 2009). According to Thaler, businesses can use this principle to get higher prices by more clearly communicating high costs to the consumers (Thaler 1985). Anderson et al. (2010) put focus on the value communication strategies in order to manage customer expectations of a fair price, one key point being that customers should be able to verify the differential value with their own data when applicable.

According to prospect theory, behavioral biases should be taken into account when firms set their price in relation to the expected reference price as consumers react differently to gains (lower price than the reference price) than to losses (higher price than the reference price), reacting more disproportionately negatively to losses (Kahneman, 2012). The empirical results for this framing effect are mixed; however, as the loss aversion effect is reduced or disappears when consumers are segmented on their brand loyalty (Bell and Lattin 2000; Krishnamurthi et al. 1992; Mazumdar and Papatla 1995). The idea might still be worth considering for new services as there might be limited brand loyalty established.

Another principle affecting purchase behavior, especially when considering discounts, is the relative value of money (Homburg et al., 2009). Thaler (1980) demonstrates this through an example: Consider you are buying a clock radio. You find one for \$25; however, a friend tells you that another store only 10 minutes away has the same clock for \$20. You are now asked if you would go to the other store to get the same clock for \$5 less. Then you are asked to consider the same situation, but now you are buying a TV for \$500, and the other store has the same TV for \$495. Would you be as willing to get the TV as the clock radio? For these reason, firms should evaluate promotions not only on dollar value, but rather on the relative price change from the original price. The same should also be true for the difference between real and reference prices.

Besides the effects already mentioned, Nagle, Hogan, and Zale (2016) summarizes additional factors influencing price sensitivity, or sensitivity to the price-value trade-off. These additional effects are the shared cost effect –buyers are less price sensitive when they are not paying the bill themselves, the switching cost effect –buyers are less price sensitive the greater the added cost of switching service, the perceived risk effect – buyers are less price sensitive when it is difficult to compare service providers and the cost of not getting expected results are high, and lastly the importance of end benefit – that buyers are less price

sensitive when the service is a small part of the cost of a benefit with high economic or psychological importance.

Summarized, firms striving to arrive at their final set of prices should ask themselves how much value they should try to capture with regards to the company strategy, and what the price-volume trade-offs would be at these alternatives. Also, they should ask themselves whether there are any shared economies or other circumstances that would make tactics such as discounting or bundling favorable for improvements of long-term total profits. Lastly, careful consideration should be placed on forecasting customer reactions to the price and its perceived fairness, and how to deal with these behavioral issues through a clear value communication strategy.

Once companies have gone through each of these four stages, they should have a good idea of what the optimal set of prices should be. On an ending note, it must again be stressed that pricing is not an isolated issue. Pricing is a tool that can have a great impact on the profitability of firms, but it cannot be the sole source of profitability. Good pricing practices puts pricing in alignment with other endeavors and objectives of the company while keeping an open dialogue with prospects and customers. Deviations in prices should be planned for throughout the life cycle.

The empirical section of the thesis will concentrate on a quantitative model of pricing. The conceptual framework used sees great similarities with the pricing model established in this theoretical section. Notably, the conceptual framework used in the empirical part starts at the competitive price range, and only implicitly include stages prior to that.

3 Methods

This section will present the theory behind the methods utilized in this thesis. First, surveying as a research method will be reviewed before drilling down into construct and scale development. Lastly, methods of statistical analysis will be presented.

3.1 Survey as a Research Method

The definition here of surveys is that of self-administered quantitative surveys, which are defined as those where respondents answer the survey without assistance or supervision and without open-ended answers. Surveys are the most common method to collect primary data (Armstrong and Kotler, 2006). They provide a clear instrument for collecting descriptive information when the researcher is aware of what information is to be sought and quantified.

There are a wide range of possible issues with surveys as a research method. Aaker et al. (2010) lists these possible issues depending on where in the procedure they are present. First, the researcher must make sure that the population has been correctly defined and that the sample is representative of the population (for example by controlling for non-response bias). Next, one must make sure that all respondents understand the questions asked correctly and in the same way. Even if they do, researchers must also make sure that the respondents have the appropriate knowledge required and remember that knowledge so that they can answer the questions appropriately. Further, respondents might also be tilting their response towards one that they find socially desirable, which introduces social response bias (Ingenbleek et al., 2013). A key issue is also that respondents might never have thought about the question being asked (Armstrong and Kotler, 2006). Lastly, the issue of response rates is more profound for self-administered surveys than for other methods of data collection. The issue is not always that adequate response rates cannot be obtained, but rather that they are hard to predict a priori (Aaker et al., 2010).

Researchers utilizing self-administered surveys should consider how the prospects of the survey should be contacted and addressed, as this can have a major impact on the response rate. Researchers should also, when possible, provide an incentive and consider the length and general user-friendliness of the survey to get a response rate as high as possible. Note, however, that a high response rate does not necessarily mean that non-response bias cannot be present in the data. Hence, it is important for researchers to identify and understand possible response and non-response patterns in their data. (Aaker et al., 2010)

3.2 Construct and Scale Development

The development of constructs is necessary when the variable to be observed cannot be observed directly. These directly unobservable variables are called latent variables (Borsboom et al., 2003). When these latent variables correspond to an hypothesized attribute assumed to be reflected in test scores, the term construct is appropriate (Cronbach and Meehl, 1955). These have to be approximated by creating scales (a group of questions) that tackle the measurement issue from several angles. The questions (or items) are then typically summed for the creation of a multi-item measure that works as an approximation of the latent variable. It is widely recommended to use multi-item measures instead of single-item measures in order to improve the performance of the scale (e.g. Churchill, 1979). One classic example of a latent variable is the measurement of intelligence (which in fact is a combination of five different latent variables). One may use theoretical knowledge, empirical research, or both when hypothesizing what latent variables could be present (Suhr, 2006). The issue, that a set of items forming a scale should only measure just one thing in common, is assessed by addressing unidimensionality (Hattie, 1985). Exploratory factor analysis can be used for preliminary assessment, but confirmatory factor analysis provides a more rigorous test of unidimensionality and should hence be applied as demonstrated with synthetic data by Gerbing and Anderson (1988). Confirmatory factor analysis has, however, more stringent requirements on sample size, and was therefore excluded from this thesis (Suhr, 2006).

Even if unidimensionality is of great importance in successful scale development, it is not sufficient to assess only this. Reliability, or the internal consistency of the scale, is also of great importance. There would not be much use of a scale measure that fluctuated wildly as a cause of measurement error. Reliability is a measure of how stable the scale scores would be if they were tested again on a different sample. Reliability should, however, be assessed after unidimensionality has been accepted and established (Gerbing and Anderson 1988). Although unidimensionality and reliability has sometimes been confused and mixed (specifically, the most common measure of reliability has been confused with an indicator of dimensionality), they are two distinct issues. Gerbing and Anderson (1988) explain: “The dimensionality of a scale can be evaluated by examining the patterning of its component indicator correlations, whereas the reliability of a scale is determined by the number of items that define the scale and the reliabilities of those items.” Based on unidimensionality and reliability tests scales are then purified by dropping items scoring badly on these tests. The final scale should then be a good measure of the hypothesized latent variable.

Summarized, the identification of constructs should be rooted in theory. Several items measuring the same latent variable should be identified at first, before a purification procedure is performed in order to obtain the final scale measuring the latent variable.

3.3 Methods of Statistical Analysis

For preliminary assessment of unidimensionality, exploratory factor analysis (EFA) has been utilized, though the analysis is not indeed a true test of unidimensionality. Confirmatory factor analysis (CFA) is one method recommended for testing unidimensionality (e.g. Gerbing and Anderson, 1988; Furr and Bacharach, 2013), and has been performed as well. A very-simple-structure (VSS) analysis was also utilized assisting the determination of the optimal number of factors in the data. Cronbach's alpha and Spearman-Brown have been used for assessing the reliability of the scales. These measures and techniques are presented in this section.

3.3.1 Exploratory Factor Analysis

Traditionally factor analysis has been utilized to explore the underlying structure of a set of interrelated variables without imposing any hypothesized structure on the outcome (Child, 1990). With EFA, the number of constructs and the underlying factor structure can be identified (Suhr, 2006). One issue with EFA is that it might suggest more factors than what is theoretically justifiable, often as a cause of garbage-items that do not load on the hypothesized factors but do lead to an extra number of factors being identified (Churchill, 1979). There are a number of different extraction methods and rotation options available from which to choose. For the purpose of this study, a minimum residuals extraction method was used along with a conventional orthogonal varimax rotation. The minimum residuals extraction method finds its advantage in producing similar solutions to the recommended maximum likelihood procedure even for badly behaved matrices (Personality-Project; Costello and Osborne, 2005). Costello and Osborne (2005) recommended the use of oblique rotation techniques, where factors are allowed to be correlated, since an oblique rotation will reproduce an orthogonal rotation but not the other way around. For this thesis, however, a conventional orthogonal varimax rotation was seen as a better choice since orthogonal rotations, where factors constrained to be uncorrelated, can improve interpretability. Note that rotation methods are only a transformation that improves the interpretability of the solution rather than improving the factor solution itself.

When using EFA as support for assessing unidimensionality and factor number identification, interpretability criteria were used along with a very-simple-structure analysis for the factor number identification. The interpretability criteria were the identification of high loadings and cross-loadings. High loadings, with loadings of at least 0.3 (Suhr, 2006) or 0.4 (Gerbing and Anderson, 1988) were kept. Cross-loadings, with factor loadings of 0.3 on at least two factors were removed (Costello and Osborne, 2005).

3.3.2 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is a statistical technique used to verify a theorized factor structure of observed variables (Suhr, 2006). As such, an a priori belief of the factor structure is needed, as CFA is a validation test of a hypothesized factor structure. One may use theoretical knowledge, empirical research, or both when determining the hypothesized a priori factor structure to be tested. Confirmatory factor analysis is often used in behavioral sciences and other areas of research where surveys are used to collect data on multi-item scales that measure latent constructs. The role of CFA is that it can verify that these constructs are truly different, and that the data fit the hypothesized model. Though exploratory factor analysis can be used for preliminary assessment, confirmatory factor analysis provide a more rigorous test of unidimensionality and should hence be applied as demonstrated with synthetic data by Gerbing and Anderson (1988).

To evaluate CFA model fit, several measures are used. Absolute measures used are the chi-square test, root mean squared error of approximation (RMSEA) and standardized root mean square residual (SRMR). The comparative fit index (CFI) has been used as a relative measure of model fit. Absolute measures of model fit directly examines how well the model fit the data, while relative measures compare the specified model to that of a null model, most often under the constraint that all variables are uncorrelated (McDonald and Ho, 2002). The chi-square goodness-of-fit statistic tests the magnitude of discrepancies between the data and the fitted covariance matrix (Hu and Bentler, 1999). In this study a conventional 5 % limit has been used to accept or reject the model, which means that a p-value below 0.05 rejects the null of perfect fit and that values higher than this should be accepted. Because of this slightly backwards interpretation, it has sometimes been called the “badness-of-fit” test (Hooper et al., 2008). Chi-square tests are, however, sensitive to sample size. The RMSEA on the other hand is less sensitive for sample size, and is reported with confidence intervals making it easier to interpret with small samples (Hooper et al. 2008). Hu and Bentler (1999) recommended a cutoff value of the RMSEA close to 0.06 while Hooper et al. (2008)

recommends that the confidence interval stay in the limits of 0.00 to 0.08. The SRMR calculates the squared difference between the residuals of the sample covariance matrix and the a priori covariance model (Hooper et al. 2008). Cutoff values recommended ranges between 0.05 and 0.08 (Hooper et al., 2008; Hu and Bentler, 1999). The CFI is also comparably forgiving with regards to sample size as compared to other fit indexes (Hooper et al., 2008), even being reported as one of the most forgiving measures with regards to sample size (Fan et al., 1999). A recommended threshold for the CFI is 0.95, and values should be higher than this (Hu and Bentler, 1999).

Further, one does also need to address the discriminant validity of the constructs. Discriminant validity is “the degree to which measures of different concepts are distinct” (Bagozzi and Philips, 1991). In other words, one needs to make sure that the hypothesized constructs are truly different. This is of particular importance in this study, as we have three different constructs measuring price-setting practices and we need to make sure that these are truly distinct. To assess the discriminant validity of the measures, the procedure recommended by Bagozzi and Philips (1982) and Anderson (1987) was used, specifically, the chi-square difference method. This method runs each CFA twice, once to constrain the correlation between factors to one, and once to release this constraint. The chi-square difference between these models then tests whether the constructs are truly different.

3.3.3 Very-Simple-Structure

A very-simple-structure (VSS) analysis is used for support in determining the number of factors to extract. The VSS works by maximizing the VSS criterion of goodness of fit. In short, it lives up to its name in the sense that the method tries to find an optimal simple solution for the correlation matrix in an EFA in order to find the optimum number of factors to extract. VSS can be performed with different factoring methods and rotations. (Revelle, Rocklin, 1979)

The output of a VSS analysis utilized here comes in the form of the statistic complexity. Complexity 1 means that all except the greatest absolute loading for an item is ignored, while complexity 2 means that all except the two greatest absolute loadings for an item is ignored and so on. The optimal factor solution is then likely to be the solution that maximizes this value complexity value.

3.3.4 Reliability Tests

For reliability testing of the scales, Cronbach's alpha, item-total-correlations and Spearman-Brown's prophecy formula has been utilized. Cronbach's alpha is the most widely used measure of reliability by marketers (Gerbing and Anderson, 1988), even if it has received substantial criticism (eg. Revelle and Zinbarg, 2009). It has been proposed that Cronbach's alpha can be interpreted as the expected correlation between two tests measuring the same construct (Nunnally, 1978). Many professionals hold an alpha of 0.7 as a threshold for reliability, but an acceptable threshold is ultimately dependent on the use case of the data. Schmitt show that alphas even as low as 0.5 do not substantially weaken validity coefficients (Schmitt, 1996). Churchill (1979) cites Nunnally (1967), stating that alphas in the range 0.5 – 0.6 may be sufficient for early stages of research, while it is probably unnecessary to try to increase alpha over 0.8. In the case of a two-item scale, however, Cronbach's alpha is effectively the lower bound of reliability, and will hence underestimate the true reliability in most cases (Eisinga, Grotenhuis and Pelzer, 2013). Even if two scale items are not recommended, sometimes circumstances require researchers to estimate reliability of two-item scales. In this situation, Eisinga et al. (2013) recommends the use of Spearman-Brown instead of Cronbach's alpha as they show that the coefficient bias is on average larger for Cronbach's alpha than for Spearman-Brown on two-item scales. The Spearman-Brown formula calculates an aggregate measure of the proportion of every single item's variance explained by the true score to the proportion unexplained. The Spearman-Brown coefficient for reliability is interpreted in the same way as Cronbach's alpha. Item-total correlations, on the other hand, have long been advocated for by e.g. Nunnally (1978) and Kline (1983). The basic idea is to correlate the item scores with the total score of the scale (Gerbing and Anderson, 1988). Again, different thresholds are advocated for depending on the purpose of the study. Churchill (1979) only states that item-total correlations near zero should be deleted as well as items that cause sudden drops in item-total correlations.

4 Survey Design

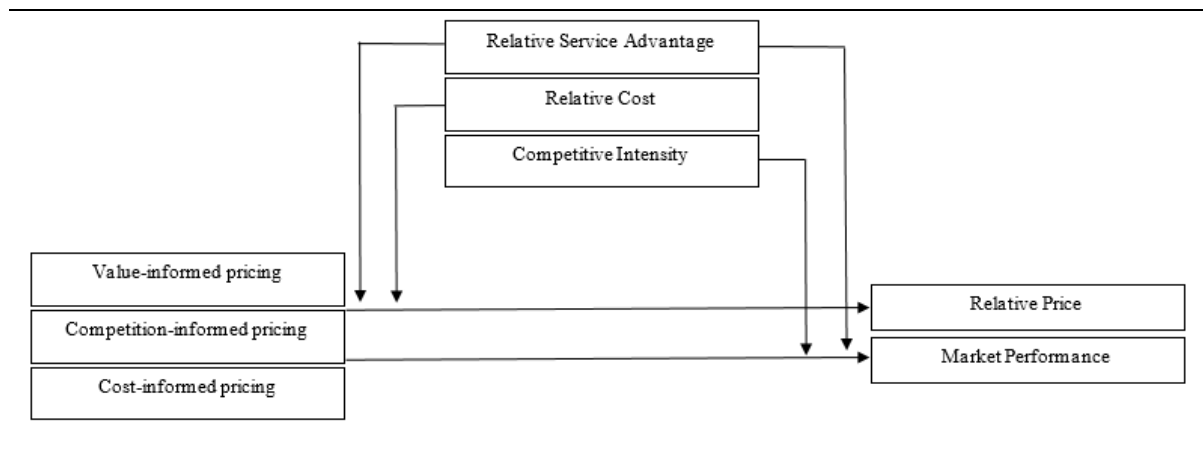
The survey was framed to be answered based on the latest service introduced to the market that had been on the market for at least 12 months, to get valid measures of market performance. Respondents were stimulated to participate by ensuring anonymity and by offering the results as well as a summary of the pricing literature as a reward for participation.

This part will step-by-step cover how the survey was designed and carried out. First, the conceptual framework utilized and construct development will be presented, followed by a walkthrough of the scale development. Lastly, the data collection procedure is presented.

4.1 Construct Development

The conceptual framework utilized for the construct, and accordingly scale, development is that presented in Ingenbleek et al. (2013). It draws on Monroe's pricing discretion model (2003), consumer price perception literature and numerical cognition literature. It also holds striking similarities to that presented in the theoretical section of this thesis. The price-setting practices in the conceptual framework of Ingenbleek et al (2013) can be closely linked to the decision where in the competitive price range a firm should place its final set of prices. The relative service advantage can be linked to the differential value measure of the pricing model presented in the theoretical section of this thesis. Relative cost and competitive intensity are both important aspects of the pricing model as well. Two key distinctions, however, are the pricing models focus on the final set of prices, rather than targeting of the competitive price range as in the conceptual framework by Ingenbleek et al. (2013). This difference could possibly be attributable to the distinction between the classical definition of pricing strategy (penetration vs skimming pricing) and the more complex definition by Tellis (1986) utilized in the pricing model. The other difference lies in the outcome variables. While the pricing model emphasizes total discounted lifetime profits, the conceptual framework by Ingenbleek et al. (2013) presents two distinct outcome variables representing pricing power, in the form of relative price, and market performance as compared to stated objectives. An illustration of the conceptual framework is found in figure 5.

Figure 5. Conceptual Framework (Ingenbleek et al. 2013)



As managers aim to set prices for a new service, they start with no information. Therefore, they aim to collect information about quantifiable variables. As stated by Ingenbleek et al. (2013) customer value, competition and costs are the only variables that can be usefully quantifiable from scratch. This view is also supported by range of other authors (e.g. Dean, 1976; Nagle, Hogan, Zale, 2016; Anderson et al., 2010; Marn et al., 2003). The practices for establishing estimates of customer value, competitor's prices and costs are labeled price-setting practices (not to be confused with pricing practices as in Monroe 1993). It is proposed that the use of different price-setting practices will impact market performance and pricing power (the relative price charged as compared to the competition) differently under certain conditions (Diamantopoulos, 1991). These conditions are the level of service advantage over or below the competition, the relative cost of the service as compared to the competition, and the level of competitive intensity in the market. These moderating variables all find support in the new product performance literature.

Relative service advantage is seen as one of the strongest predictors of market performance (Henard and Szymanski, 2001) and also connects to the price ceiling of Monroe's price discretion model (Monroe, 2003), as relative service advantage refers to the relative superiority of the service over the competition (Gatignon and Xuereb, 1997; Ingenbleek et al., 2013). Interestingly, Ingenbleek et al. (2013) found that practicing the wrong price-setting practices could erode this effect. Competitive intensity refers to the degree to which competitors are active in the market and actively driving change (Atuahene-Gima, 1995) and is expected to have a negative effect on market performance. This is because competitive advantage tends to erode in highly competitive markets (Achrol, 1991;

Homburg and Pflesser, 2000), even if a paper by Dawar (2013) suggest that this might not always be the case. Further, in the same way we connected relative service advantage to the price ceiling, we connect the price floor to the relative cost, which refer to the direct and indirect costs of taking a service to the market and keeping it there (Gatignon and Xuereb, 1997; Marn et al. 2003). The construct measuring market performance captures the achievements of a newly introduced service relative to its pre-stated objectives (Atuahene-Gima, 1995) while the relative price captures the pricing power a company holds relative to its competition.

The information needed to quantify customer value, competitor's prices and costs is often incomplete or imprecise, which forces managers to act on estimates. The greater the uncertainty regarding the numerical estimates or how they interact in the pricing environment, the more the pricing decision makers must prepare for alternative sources of information and look for alternative ways of determining the estimates (Pich, Loch, De Meyer 2002). See definitions of the price-setting practices in table 3.

Table 3. Definitions of Price-setting Practices (adapted from Ingenbleek et al. 2003)

	Definition
Value-informed Pricing	Setting prices based on information on customers' perception of the benefits that the service offers and that they trade off against the price.
Competition-informed Pricing	The price-setting practice of setting prices based on competitors' prices relative to their market positions.
Cost-informed Pricing	Setting prices based on information on fixed, variable, direct and indirect costs for developing, maintaining and marketing the new service.

These price-setting practices represent the first three constructs, and the logic behind them find support among other authors as well (e.g. Marn et al., 2003; Nagle, Hogan, and Zale, 2016). Ingenbleek et al. points out that studies have also previously considered customer value, competition and costs, but that they have done so in the form of pricing methods. Pricing methods are mutually exclusive methods to make a pricing decision (e.g. Piercy 1981; Udell 1972; Zeithaml, Parasuraman, and Berry 1985). Here, as well as in Ingenbleek et al. (2003, 2013) the focus is on price-setting practices, by which the conceptualization state that managers make pricing decisions based on assessments of multiple types of information and combinations of these different information types. Since these constructs can all be viewed as price-setting practices, it is important that we can

distinguish them from each other and provide evidence that they truly are different. The price-setting practices should, however, be seen as a matter of degree and not as mutually exclusive categories (Ingenbleek et al., 2003). As such, managers should, according to the conceptual model, put different weights on the price-suggestions set by the different price-setting practices when determining the final price. The outcome variables measuring the success of these price-setting practices are a construct on market performance and a single item construct on relative price. As stated in Ingenbleek et al. (2013), the pricing discretion model is consistent with game theoretical studies as well as other pricing literature (Brandenburger and Stuart, 1996; Lippman and Rumelt, 2003; Winer, 2006; Nagle, Hogan and Zale, 2016).

4.2 Scale and Item Development

All scales in this thesis are based on those used in Ingenbleek et al. (2013). These in turn, are all based on existing scales that have been tested before their study. All items were measured on a 1-5 likert scale. The scales and items for the price-setting practices measures are based on Ingenbleek et al.'s 2003 paper. The original items for these scales are as follows:

“To what degree were the following factors included in the price-setting process of the new service? In other words, to what extent did you take into account the following elements while determining the price of the new product/service? (1 = was not important at all in price setting, 5 = played a major role in price setting)”

Value-informed pricing

X3. The advantages the new service offers to the customer

X4. The balance between advantages of the service and the possible price (price-quality comparison)

X5. The advantages of the product/service offers, as compared with competitors' services

Competition-informed pricing

X6. The price of competitors' services

X7. The degree of competition on the market

X8. The competitors' current price strategy

X9. The market structure (number and strength of competitors)

*Cost-informed pricing**X10. The share of fixed costs in the cost price**X11. The cost price of the service*

For digital services, however, there was a need to develop completely new items for the cost-informed pricing construct as digital services inevitably have a different cost structure as opposed to products and normal labor-intensive services. Digital services typically have zero or almost zero variable cost, given a fixed amount of infrastructure (Huang and Sundararajan 2011). As a result of this digital services typically have an exceptionally large proportion of fixed costs such as those related to research and development. This makes cost-informed pricing more complicated for digital services companies since the cost per unit is more dependent on accurate estimates of volume than for their manufacturing or labor-intensive service counterparts (Ingenbleek et al. 2003). In order to build a reliable measure for cost-informed pricing applicable to digital services, one needs to include items crucial for determining the cost price for digital services. One metric that capture both the full cost and indirectly the volume estimates is target return on investment. Another metric that is well applicable for cost-informed pricing in digital services is the price necessary for break-even, since this effectively identifies the price-floor. Further, even if digital services are often modeled as information goods with zero marginal cost, Huang and Sundararajan show that the commonly used full cost recovery method is often suboptimal, and that firms should model capacity increases as semi-fixed costs (Huang and Sundararajan, 2011). Accordingly, an item related to projections of future capacity increases was included. Also, instead of using the term cost price, it was decided to go with total cost instead as this terminology is clearer for professionals not familiar with accounting terms. Finalized, the new items for cost-informed pricing for the case of digital services were as follows:

“To what degree were the following factors included in the price-setting process of the new service? In other words, to what extent did you take into account the following elements while determining the price of the new product/service? (1 = was not important at all in price setting, 5 = played a major role in price setting)”

Cost-informed pricing

X10. Target return on investment

X11. The price necessary for break-even

X12. The total cost of the service

X13. Costs of future capacity increases

The scale for service advantage was originally (in Ingenbleek et al. 2013) adapted from Gatignon and Xuereb (1997). The relative service advantage construct is meant to capture “various sources of competitive advantages in terms of attributes, benefits and image” (Gatignon and Xuereb, 1997). In the final scale, there were items regarding service quality, the ability to express trustworthiness and expertise, reliability and one item regarding the overall advantage of the service. This scale is exactly the same used in Ingenbleek et al. (2013).

“How do you estimate the relative advantages of this product/service as compared with competitors’ products services for... (1 = no relative advantage, 5 = very high advantage)”

Relative Service Advantage

X14. Service quality

X15. Expressing trustworthiness and expertise

X16. Reliability of the service

X17. Overall advantage of the service

Gatignon and Xuereb (1997) also developed the scale for relative service cost that Ingenbleek et al. (2013) adopted for their study. There was a need to modify the scale in this study as well in order for the items to comply with the cost structure and certain elements of digital services. Accordingly, the item on manufacturing or operations cost was excluded in favor for an item on the cost of relative capacity increases based on Huang’s and Sundararajan’s (2011) research on semi-fixed cost in digital services. The other items cover marketing costs, research and development costs and total costs. Below is the original scale as well as the scale updated for digital services.

“How do you estimate the relative costs of this service as compared with competitors’ services, for... (1 = very low relative costs, 5 = very high relative costs)”

Relative Costs (original scale)

X18. Marketing costs

X19. Manufacturing / operations costs

X20. Research and development costs

X21. Total costs

Relative Costs (for digital services)

X18. Marketing costs

X19. Research and development costs

X20. Total costs

X21. Cost of capacity increases

For the scale measuring competitive intensity, a choice was made to keep with Ingenbleek et al.’s (2013) focus on changes made by competitors that are likely to affect pricing decisions. These changes are changes in the services, changes in sales strategies and changes in promotion and advertising strategies and they were measured by asking respondents to rate the degree to which these occur in the market where the new service was launched.

“Rate the extent to which the following changes occur in the market on which you launched the service... 1 = little to no extent, 5 = to a very high extent”

Competitive Intensity

X22. Changes in services offered by your competitors

X23. Changes in sales strategies by your competitors

X24. Changes in sales promotion / advertising strategies by your competitors

Homburg and Pflesser (2000) presented a six-item scale for market performance which was adopted into a five-item scale by Ingenbleek et al. (2013). In this study, Ingenbleek’s version was kept without changes. Differences between Homburg and Pflesser’s (2000) scale and the one used in this study and by Ingenbleek et al. (2013) are a shift in focus from customer value to competitive advantage, so the item is less likely to load on the relative service advantage or value-informed pricing constructs. Items related to company-wide

objectives were also removed as well, as the objectives in a pricing context should be service-specific.

“Rate the extent to which the service has achieved the following outcomes (compared with their predetermined or expected objectives) during the first 12 months after launch of the service... 5 = was completely reached, 1 = was not reached at all)”

Market Performance

X25. The degree to which the product satisfies a customer want or need as compared with the objective or expectation

X26. Sales to current customers as compared with the objective or expectation

X27. Sales to new customers as compared with the objective or expectation

X28. Market share as compared with the objective or expectation

X29. Degree to which the product offers a competitive advantage as compared with the objective or expectation

The measurement of relative price consists of a single item asking respondents to indicate the relative price of their offering compared to their competition, and is used as an estimate of pricing power. The single item measure in Ingenbleek et al. (2013) was adapted from Chen and MacMillan (1992) as well as Noble and Gruca (1999).

Relative Price

X30. Please indicate the relative price of your product

- 1. – 5 % or less than the market*
- 2. – 2 % to – 5 % less than the market*
- 3. + / - 2 % around the market*
- 4. + 2 % to + 5 % more than the market*
- 5. + 5 % or more than the market*

The scale scores were obtained conventionally by summing the item scores (Gerbing and Anderson, 1988). All scale-items can be found in appendix A. Three background questions were also added to the survey. One asking respondents to state their position at the company (open text question), one to state the company size in number of employees (< 50, 51 – 100, 101 – 500, > 500), and one to state what type of market their company is operating in (B2B, B2C, Hybrid).

4.3 Survey Testing

Since there was a lack of willing respondents, no quantitative survey testing was conducted. Given the fact that all scales had been tested before (except for the items measuring cost-informed pricing), a decision was made that qualitative survey testing would be enough. In the qualitative survey testing, emphasis was put on how clearly the questions were communicated, and therefore how easily understandable they were. First, an informal meeting was set up with non-respondents so that they could comment on how easily understandable the questions were. No changes were made after this meeting. Second, two respondents answered the survey. These respondents gave immediate feedback by phone while answering the survey. As a result of this early feedback, the item for marketing costs in the relative cost scale was expanded to include customer acquisition costs.

“How do you estimate the relative costs of this service as compared with competitors’ services, for... (1 = very low relative costs, 5 = very high relative costs)”

Relative Costs

X18. Marketing costs, including customer acquisition costs

X19. Research and development costs

X20. Total costs

X21. Cost of capacity increases

The single-item scale for relative price was also expanded to make the question clearer and offer as little room for subjective interpretation as possible. Included in the question was now industry-jargon from the gaming industry, which has a very different pricing structure as compared to other digital services. The new single-item scale for relative price was:

X30. Please indicate your average unique purchase value, or price, relative to your market.

5 Propositions

Since the sample size is small in this study, analysis is conducted in an exploratory manner. Hence, this study takes some liberty interpreting outputs in order to find possible effects with support in the literature, rather than hard hypotheses testing. Still, there are a few propositions that we want to check.

First, I agree with Ingenbleek et al. (2013) that there should be an unconditional positive effect of value-informed pricing on market performance. The practice of value-informed pricing has long been advocated for (e.g. Monroe, 2003; Nagle, Hogan, and Zale, 2016) with the motivation that value-informed pricing leads to better possibility of creating a positive trade-off between quality and price for the customers.

P1: More use of value-informed pricing leads to higher market performance.

Next, as relative service cost decreases, there should be a positive effect of cost-informed pricing on market performance. The motivation here is that, as relative cost decreases, an opportunity for penetration pricing opens up for the company. This is stated as a condition for penetration pricing by Dean (1976) among others.

P2: As relative cost decreases, there is a positive effect of cost-informed pricing on market performance.

For the third proposition, I agree with Ingenbleek et al. (2013) that a higher relative service advantage should lead to an increase in the positive impact of value-informed pricing. Earlier papers have stated that prices of high-quality products and services are higher in order to cover costs and create an incentive to create quality (Klein and Leffler, 1981; Rao and Monroe, 1996).

P3: With higher relative service advantage, the positive impact of value-informed pricing on relative price increases.

The logic behind the fourth proposition is simple. By putting too much weight on cost-informed price-setting practices, too much weight is put towards the price floor. This effect is more pronounced when relative service advantage is high. This effect was tested and proven by Ingenbleek et al. (2013).

P4: With higher relative service advantage, the negative impact of cost-informed pricing on relative price increases.

Lastly, Monroe (2003) states that competitive intensity can shrink the competitive price range from the ceiling. Competitive intensity is also expected to have a negative effect on market performance as competitive advantage is expected to erode more quickly in highly competitive markets (Achrol, 1991; Homburg and Pflesser, 2000). Accordingly, we have our fifth and sixth proposition:

P5: Competitive intensity has a negative effect on relative price.

P6: Competitive intensity has a negative effect on market performance.

With these six propositions stated, the results are presented in the next section. There were other hypothesis stated, and proved, by Ingenbleek et al. (2013) that would have been interesting to explore. Unfortunately, with a sample size this small, no three-way effects can reasonably be included in the analysis.

6 Results

First, an initial list of 106 digital service providers based in Finland was collected. The list included company name, website and contact information. The list of companies was gathered manually by browsing sites consolidating companies in the digital services industry (such as e.g. startup100.net). Thereafter, contact information was collected from the companies' websites. As the person responding to the survey had to have knowledge of the company strategy as well as the pricing process, only people in suitable positions were selected (such as CEO's, CFO's and CMO's). After revising the list based on which companies had had a service on the market for at least 12 months, 78 companies remained. After contacting all companies by phone and e-mail, 20 responses were received for a response rate of 26 %. Even if this sample is too small to make any sufficient statistical analysis, a decision was made to carry on with the research as a preliminary study. The decision was made because of time-constraints, as it had proven to be an extremely time-consuming activity to collect both list information as well as survey data.

6.1 Description of Sample

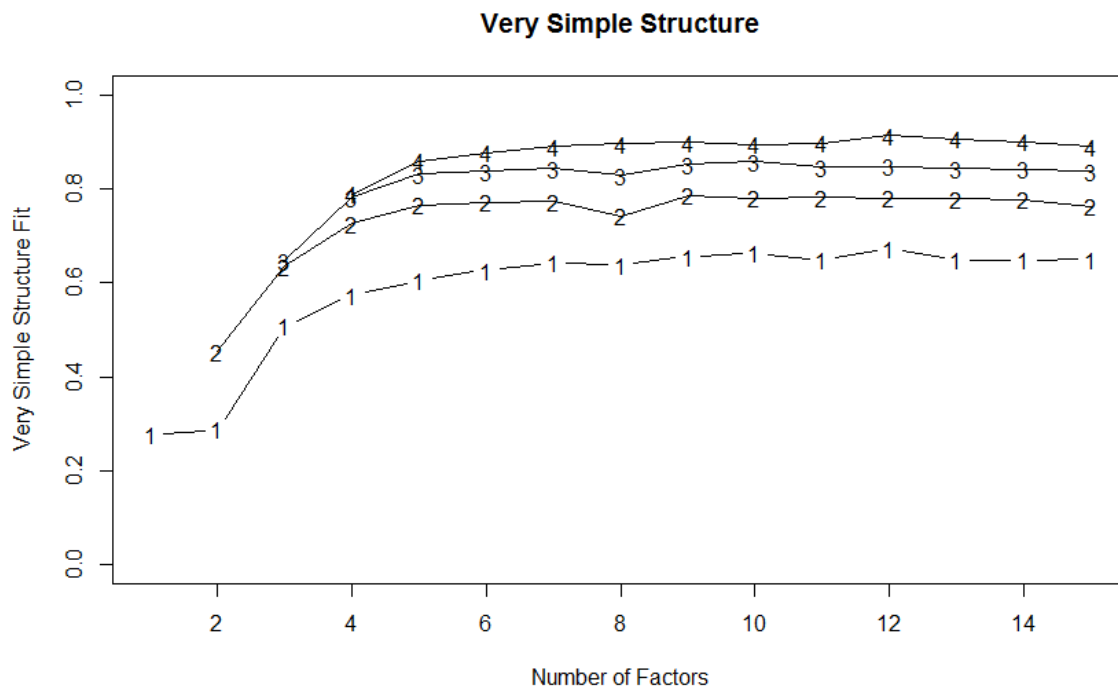
Of the respondents, 14 reported to be operating in a B2B market (70 %), 1 reported to be operating in a B2C market (5 %), and 5 reported to be operating in a hybrid market (25 %). In the sample, 19 companies had less than 50 employees while one company had 100-150 employees. The survey was filled out by 10 CEO's (50 %), 6 founders, owners or co-founders (30 %), one Finance Director, one Chief Marketing Officer, one Managing Director, and one Chief Operating Officer (5 % each).

Non-response bias was checked for by subjecting all variables to ANOVA tests comparing respondents divided into early, intermediate and late respondents as well as a two-part division into early and late respondents. None of the tests were significant, which indicates that non-response bias is likely not a problem in the data. Some reservation to the tests is still in place as the small sample size would crave large differences in order for the tests to be significant. Common method bias was also tested for by subjecting all measures to a Harman's one-factor test. The results showed that the unrotated one-factor solution only accounted for 21 % of the variance, indicating that common method bias probably is not an issue.

6.2 Construct Validity and Scale Reliability

First, a very-simple-structure (VSS) analysis was conducted in order to check the most probable number of factors found in the data in an exploratory manner, to check if this number was consistent with the proposed number of factors. For the VSS, the minimum residuals factoring method was used with a varimax rotation, the same used for the exploratory factor analysis. The VSS analysis concluded that the complexity 1 peak show twelve factors, but that it is probably more reasonable to think about the proposed number of seven factors as the complexity flattens out at that number of factors with only marginal bump in improvement by adding more factors. There is also a noticeable downwards bump at the eight-factor solution for complexity 2 and complexity 3. This effect is illustrated in figure 6.

Figure 6. VSS Analysis Graphical Output



Next, an exploratory factor analysis (EFA) was conducted in order to identify how well the items loaded on the proposed number of factors. The items loaded generally well on the proposed seven factors, and there was no indication that there was a better solution available with fewer or more factor solutions. Following, the EFA factor loadings with all items included.

Table 4. EFA Factor-Loadings, All Items Included.

	Value-informed pricing	Competition-informed pricing	Cost-informed pricing	Relative service advantage	Relative cost	Competitive intensity	Market performance
X3	0,31	-0,33	-0,21	0,44	0,20	0,21	0,34
X4	0,86	0,02	0,10	0,03	0,17	0,08	0,09
X5	-0,17	0,07	-0,01	0,81	0,23	-0,14	-0,12
X6	0,07	0,81	-0,16	0,12	-0,03	-0,16	-0,17
X7	0,33	0,25	0,31	0,37	-0,31	-0,28	0,04
X8	0,03	0,95	-0,01	0,11	0,04	-0,04	-0,08
X9	0,45	0,57	0,32	-0,45	-0,09	0,13	0,27
X10	0,48	-0,12	0,46	0,57	0,14	-0,14	-0,07
X11	0,06	0,00	0,82	-0,18	-0,14	-0,05	-0,06
X12	-0,07	0,35	0,55	-0,18	0,58	0,16	-0,12
X13	0,09	-0,20	0,88	0,03	0,12	0,05	0,16
X14	-0,52	-0,30	0,27	0,40	0,00	-0,11	0,28
X15	-0,21	0,12	0,57	0,46	0,22	0,16	0,33
X16	-0,03	0,26	0,07	0,12	-0,11	0,60	0,42
X17	0,09	0,19	-0,23	0,79	-0,22	0,19	0,16
X18	0,11	-0,55	0,01	0,52	0,50	0,25	0,04
X19	-0,36	0,04	-0,21	0,37	0,52	0,33	-0,33
X20	0,12	-0,05	0,08	0,19	0,91	0,01	0,02
X21	0,07	-0,04	0,01	0,00	0,93	-0,05	-0,05
X22	0,13	0,05	-0,11	-0,02	-0,19	0,84	-0,16
X23	-0,10	-0,27	0,01	-0,01	0,11	0,88	-0,07
X24	0,11	-0,17	0,12	-0,02	0,24	0,84	-0,05
X25	-0,04	-0,20	0,00	0,02	0,11	-0,24	0,85
X26	0,42	0,07	-0,05	0,23	-0,33	0,09	0,57
X27	-0,05	0,19	0,23	0,28	-0,46	0,08	0,63
X28	0,15	-0,30	0,19	-0,01	-0,04	0,22	0,75
X29	-0,07	0,01	-0,11	-0,31	0,00	-0,43	0,74

The first item of the value-informed pricing construct (X3), related to the advantages the service offer the customer, showed weak results, loading more strongly on relative service advantage. The third item on value-informed pricing (X5) loaded slightly negatively on the factor that the other value-informed pricing (V) items loaded positively on, and loaded instead highly on the same factor as the relative service advantage items. The item was related to the importance of the advantages of the service as compared to competitor's services.

Item X7 from competition-informed pricing also showed weak results, as it loaded weakly on several factors. Item X9 also loaded on both value-informed pricing as well as cost-informed pricing. The items were related to the degree of competition in the market (X7) and the number and strength of competitors (X9).

From the cost-informed pricing construct, items X10 and X12 loaded on several factors. The items were related to target return on investment (X10) and total cost (X12). From relative service advantage, all items but X17 loaded badly on other factors.

The items X18 and X19 from the relative cost construct also loaded on relative service advantage. The items were related to marketing costs (X18) and research and development costs (X19).

All items for competitive intensity loaded well on one factor while X26 and X27 from market performance loaded slightly on other factors as well. The items were related to sales to current (X26) and new (X27) customers.

Next, the data was split in two, one part to cover dimensions of price-setting practices and one two cover other constructs. This was done in order to more clearly identify hidden structures of items, especially unwanted loadings, by reducing the number of factors to be identified. Below, the factor loadings of all items for price-setting practices are presented.

Table 5. EFA Factor-Loadings of Items Related to Price-Setting Practices.

	Value-informed pricing	Competition- informed pricing	Cost-informed pricing
X3	0,30	-0,21	-0,08
X4	-0,05	0,00	0,30
X5	0,88	0,26	-0,16
X6	-0,02	0,81	-0,20
X7	0,17	0,36	0,33
X8	-0,13	0,98	0,10
X9	-0,58	0,40	0,55
X10	0,56	-0,06	0,40
X11	-0,15	-0,01	0,73
X12	-0,07	0,33	0,57
X13	0,16	-0,15	0,87

Based on this, it might be tempting to base the value-informed pricing scale on item X5, related to advantage over competitors' offerings. Remember, however, that X5 was the item that showed weak loading on value-informed pricing when all items were included, and instead loaded highly on relative service advantage. The item (X5) also showed itself to be badly correlated with the other two items. Hence, it was decided that X5 was the item to drop from the analysis. For the other price-setting practices, the decision was more straightforward. Items X6, X8, X11 and X13 were kept in the analysis. The factor loadings for items related to price-setting practices remaining after the purification can be found in table 6.

Table 6. Purified EFA Factor-Loadings Related to Price-Setting Practices.

	Value-informed pricing	Competition-informed pricing	Cost-informed pricing
X3	0,56	-0,23	-0,15
X4	0,64	0,11	0,14
X6	0,03	0,98	-0,18
X8	-0,10	0,81	0,07
X11	-0,05	0,07	0,70
X13	0,09	-0,19	0,95

The same procedure was performed for the rest of the constructs. The factor loadings for the rest of the constructs with all items included are found in table 7.

Table 7. Factor loadings not related to price-setting practices.

	Relative service advantage	Relative cost	Competitive intensity	Market performance
X14	0,09	0,06	-0,11	0,35
X15	0,61	0,27	0,12	0,2
X16	0,7	-0,07	0,34	-0,01
X17	0,68	-0,03	0,01	-0,04
X18	0,09	0,57	0,19	0,05
X19	0,13	0,43	0,24	-0,44
X20	0	0,98	-0,05	0
X21	-0,25	0,9	-0,05	-0,05
X22	0,16	-0,2	0,78	-0,25
X23	0,12	0,14	0,87	-0,15
X24	0,11	0,25	0,9	-0,04
X25	0,02	0,09	-0,23	0,82
X26	0,32	-0,16	-0,03	0,49
X27	0,63	-0,27	0,05	0,42
X28	0,12	0,05	0,38	0,87
X29	-0,1	-0,12	-0,36	0,64

Based on this, the items X14, X18, X19, X26 and X27 were be removed as these show weak loadings, loaded on the wrong factor, cross-loaded or all of these. Running the EFA on the full set of constructs, is was noticed that the item X15 loaded highly on cost-informed pricing. Hence, also X15 was removed. X16 was kept even if it cross-loaded slightly in order to keep a minimum of two items per scale. Following are the loadings of the purified non-price-setting practice constructs.

Table 8. Factor Loadings of Final Item Structure.

	Value-informed pricing	Competition-informed pricing	Cost-informed pricing	Relative service advantage	Relative cost	Competitive intensity	Market performance
X3	0,31	-0,21	-0,18	0	0,2	0,22	0,29
X4	0,98	0,07	0,1	0,04	0,1	0,03	0,04
X6	0,09	0,8	-0,2	0,08	-0,08	-0,21	-0,15
X8	-0,05	0,97	0,07	0,18	0,01	0,04	-0,1
X11	0,03	0,08	0,75	-0,29	-0,18	0,09	0
X13	0,06	-0,18	0,96	0,13	0,12	0,07	0,07
X16	0,02	0,11	0,18	0,64	-0,12	0,4	0,08
X17	0,03	0,14	-0,25	0,5	-0,07	0,05	-0,02
X20	0,13	-0,09	0,02	0,09	0,98	-0,04	-0,03
X21	0,03	0,03	-0,06	-0,3	0,95	0,05	0,05
X22	0,09	0,14	-0,03	0,09	-0,24	0,87	-0,14
X23	-0,11	-0,22	0,04	0,08	0,11	0,95	-0,12
X24	0,17	-0,17	0,19	0,19	0,18	0,78	-0,13
X25	0	-0,21	0,03	0,11	0,08	-0,27	0,83
X28	0,25	-0,33	0,19	0,22	-0,03	0,23	0,66
X29	-0,04	0,1	-0,03	-0,19	-0,07	-0,26	0,83

In this final solution, we still see some loadings that do not look too good, especially in the value-informed pricing (X3) and relative service advantage (X16) constructs. No further changes were done, as this would have caused some measures to collapse into a single-item scale, which is undesirable.

To assess unidimensionality, a series of two factor CFA models was used in order to come as close as possible to the 5 to 1 rule of sample size to parameter estimates in CFA (Kline 1998). This resulted in 21 combinations of two-factor CFA models to be analyzed. Very few items showed no signs of unidimensionality issues. In fact, the only scale that did passed the stringent CFA test of unidimensionality on all occasions was the scale for competitive intensity. There were also issues with non-converging models, probably also a cause of the small sample size. Generally, most models showed that the data fit the proposed model well. The results of the pairwise confirmatory factor analyses are summarized in table 8. A star (*) marks values below their thresholds for RMSEA and SRMR while it indicates a value larger than the threshold for the chi-square test and CFI. Non-converging models show no values.

Table 9. Two-factor CFA results.

CFA model	p-value	CFI	RMSEA	SRMR
Value-informed pricing & competition informed pricing	-	-	-	-
Value-informed pricing & cost-informed pricing	-	-	-	-
Value-informed pricing & relative service advantage	0.74*	1.00*	0.00*	0.02*
Value-informed pricing & relative cost	0.37*	1.00*	0.00*	0.04*
Value-informed pricing & competitive intensity	-	-	-	-
Value-informed pricing & market performance	-	-	-	-
Competition informed pricing & cost-informed pricing	0.52*	1.00*	0.00*	0.04*
Competition informed pricing & relative service advantage	0.55*	1.00*	0.00*	0.03*
Competition informed pricing & relative cost	0.79*	1.00*	0.00*	0.01*
Competition informed pricing & competitive intensity	0.09*	0.94	0.22	0.10
Competition informed pricing & market performance	0.28*	0.97*	0.11	0.11
Cost-informed pricing & relative service advantage	-	-	-	-
Cost-informed pricing & relative cost	-	-	-	-
Cost-informed pricing & competitive intensity	0.01	0.82	0.36	0.06*
Cost-informed pricing & market performance	-	-	-	-
Relative service advantage & relative cost	0.94*	1.00*	0.00*	0.01*
Relative service advantage & competitive intensity	0.77*	1.00*	0.00*	0.04*
Relative service advantage & market performance	-	-	-	-
Relative cost & competitive intensity	0.05	0.92	0.27	0.10
Relative cost & market performance	0.14*	0.95*	0.19	0.06*
Competitive intensity & market performance	0.02	0.86	0.25	0.15

Of the converging models, just two indicate bad fit of data to the models on all indicators. These are the two-factor combinations of relative cost and competitive intensity and competitive intensity and market performance. Other combinations showing weak results were competition-informed pricing and competitive intensity as well as cost-informed pricing and competitive intensity. Notably, the measure for competitive intensity is present in all of these combinations and hence we can assume unidimensionality issues with this measure.

To assess reliability, Cronbach's alpha and item-total correlations were used. These supported the removal of, items X5 (item-total correlation: 0.02), X7 (item-total correlation: 0.30), X10 (item-total correlation: 0.35), and X14 (item-total correlation: 0.23). Removing these items resulted in a lift in the Cronbach alpha of the scales. The Cronbach alphas and other properties of the purified measures can be found in table 10.

Table 10. Properties of Purified Measures

	Items	Mean	SD	Alpha	S-B
Value-informed pricing	2	4.15	0.81	0.46	0.63
Competition-informed pricing	2	3.50	1.03	0.87	
Cost-informed pricing	2	2.38	1.05	0.75	
Relative service advantage	2	4.05	0.71	0.50	0.67
Relative cost	2	2.43	1.04	0.94	
Competitive intensity	3	2.57	1.02	0.90	
Market Performance	3	3.55	0.83	0.80	
Relative Price	1	3.30	1.42		

As can be seen in table 9, most alphas reach a satisfactory level of 0.6, except for those of value-informed pricing and relative service advantage. These are, however, both two-item scales which makes the use of Cronbach's alpha problematic since it will underestimate the reliability (Eisinga, Grotenhuis, and Pelzer 2013). Cronbach's alpha is essentially the lower bound for the true reliability. Using Spearman-Brown with a factor of two (adding two more questions following the same characteristics), we get a new reliability for value-informed pricing of 0.6 and a reliability of 0.67 for relative service advantage. Eisinga et al. (2013) showed that the bias given by the Spearman-Brown coefficient is indeed smaller on average than that of Cronbach's alpha, on average. The Spearman-Brown coefficient is interpreted in the same way as Cronbach's alpha. Given the small sample, the reliabilities of this test seem decent, as they are in the range of 0.6 and upwards with most reliabilities bordering 0.7 or higher. The correlation matrix of the purified measures can be found in table 11.

Table 11. Correlation Matrix of Purified Measures

	1	2	3	4	5	6	7	8
1 Value-informed pricing	1.00							
2 Competition-informed pricing	-0.08	1.00						
3 Cost-informed pricing	0.01	-0.09	1.00					
4 Relative service advantage	0.19	0.18	0.01	1.00				
5 Relative cost	0.25	-0.07	-0.07	-0.19	1.00			
6 Competitive intensity	0.14	-0.13	0.12	0.36	0.02	1.00		
7 Market Performance	0.22	-0.28	0.07	0.01	0.01	-0.19	1.00	
8 Relative Price	0.12	-0.2	-0.29	-0.09	0.5	0.31	-0.27	1.00

To assess the discriminant validity of the measures, the procedure recommended by Bagozzi and Philips (1982) and Anderson (1987) was used. Specifically, the chi-square difference method. This method runs each CFA twice, once to constrain the correlation between factors to one, and once to release this constraint. The chi-square difference between these models then tests whether the constructs are truly different. Once again, the lack of data showed itself problematic since two more of the constrained models did not converge. This means that it was not possible to test the discriminant validity of nine pairs of measures.

The models that did converge, however, show good results with every pair of constructs showing significant discriminant validity on a 5 % level. The results of the chi-square difference tests are shown in table 10.

Table 12. Chi-square Difference Results

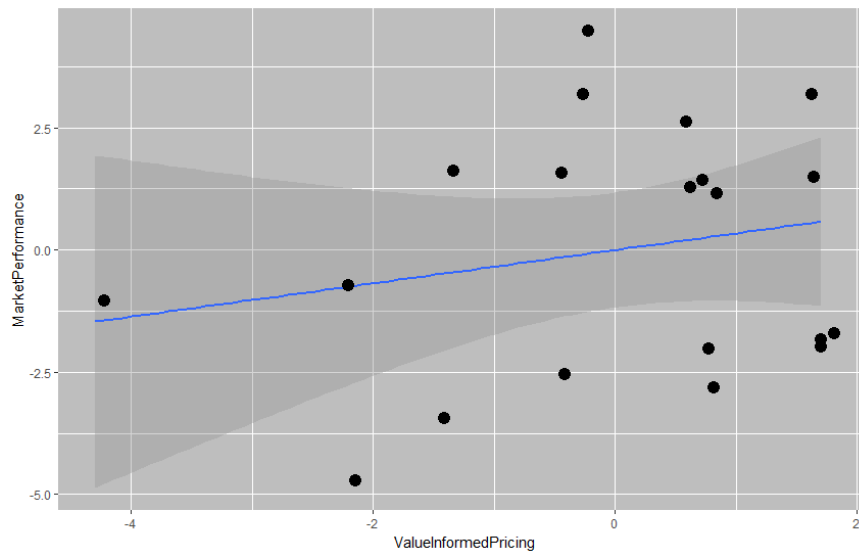
CFA model	p-value	Chi-sq Diff.
Value-informed pricing & competition informed pricing	-	-
Value-informed pricing & cost-informed pricing	-	-
Value-informed pricing & relative service advantage	< 0.01	8.03
Value-informed pricing & relative cost	0.01	6.30
Value-informed pricing & competitive intensity	-	-
Value-informed pricing & market performance	-	-
Competition informed pricing & cost-informed pricing	-	-
Competition informed pricing & relative service advantage	< 0.01	8.21
Competition informed pricing & relative cost	< 0.01	10.03
Competition informed pricing & competitive intensity	< 0.01	16.36
Competition informed pricing & market performance	< 0.01	8.58
Cost-informed pricing & relative service advantage	-	-
Cost-informed pricing & relative cost	-	-
Cost-informed pricing & competitive intensity	0.02	5.65
Cost-informed pricing & market performance	-	-
Relative service advantage & relative cost	< 0.01	10.00
Relative service advantage & competitive intensity	0.05	3.79
Relative service advantage & market performance	-	-
Relative cost & competitive intensity	< 0.01	7.73
Relative cost & market performance	0.02	5.28
Competitive intensity & market performance	< 0.01	15.14

Ingenbleek et al. (2013) did also check for social response bias, since managers may tend to justify their prices based on cost (Foxall 1972; Ingenbleek et al. 2003). For this thesis, social response bias has not been checked for because of a lack of willing respondents as well as time constraints. Notably, no social response bias was found by Ingenbleek et al. (2013).

6.3 Interpretation of Observable Effects

For the first proposition, that value-informed pricing has an unconditional positive effect of market performance, a simple scatterplot with both variables were analyzed. The scatterplot can be found in figure 7.

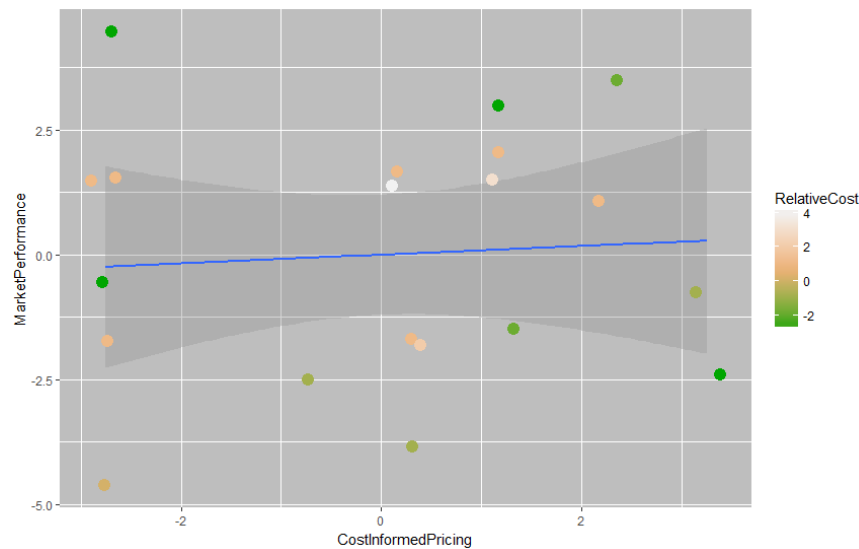
Figure 7. Effect of Value-Informed Pricing on Market Performance.



Interpreting the scatterplot, it seems like it could be possible to have a significant positive effect with a greater sample. Since the scales have been centered, the mean values of the scales are at zero. It can be seen from the scatterplot that we have some extra variance around the means, with some companies reporting higher use of value-informed pricing also reporting market performance below the mean. The same goes for some companies reporting less value-informed pricing than the mean showing higher market performance than the mean. In general, the effect is very weak, while being in the right direction.

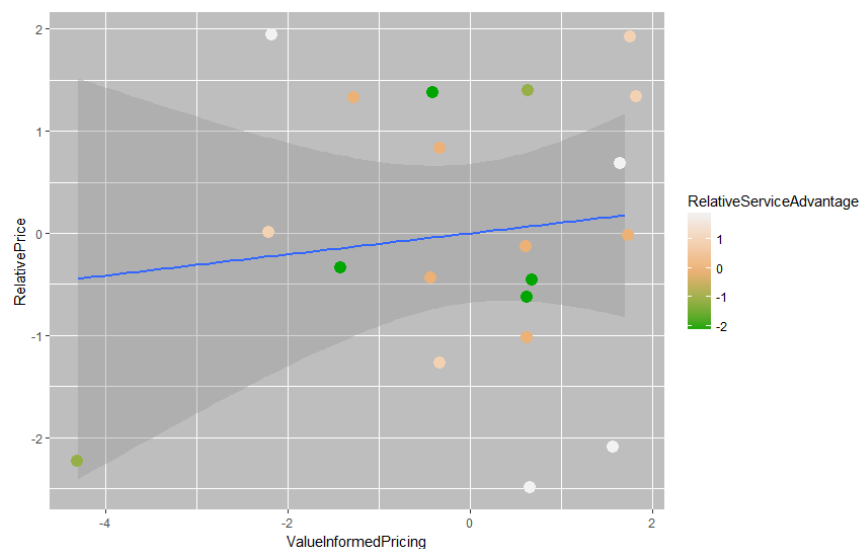
For the second proposition, that as relative cost decreases there is a positive effect of cost-informed pricing on market performance, variables were again mean centered. Examining a scatterplot with the moderating variable coded into a color scale suggest that there could be positive relationship to be found between cost-informed pricing and market performance when relative cost is high. This is, however, the opposite of what was expected and the indication is very weak. The effect seems to disappear when relative costs are low, indicating no relationship. Taken at face value, the results here are inconclusive. The effect can be studied in figure 8.

Figure 8. Effect of Cost-Informed Pricing and Relative Cost on Market Performance.



The third proposition states that higher relative service advantage could moderate a higher positive impact of value-informed pricing on relative price. Interestingly enough, examining a scatterplot illustrating the simple effect of value-informed pricing on relative price, a burst in variance is found at high values of value-informed pricing. This is illustrated in figure 9.

Figure 9. Effect of Value-Informed Pricing and Relative Service Advantage on Relative Price.

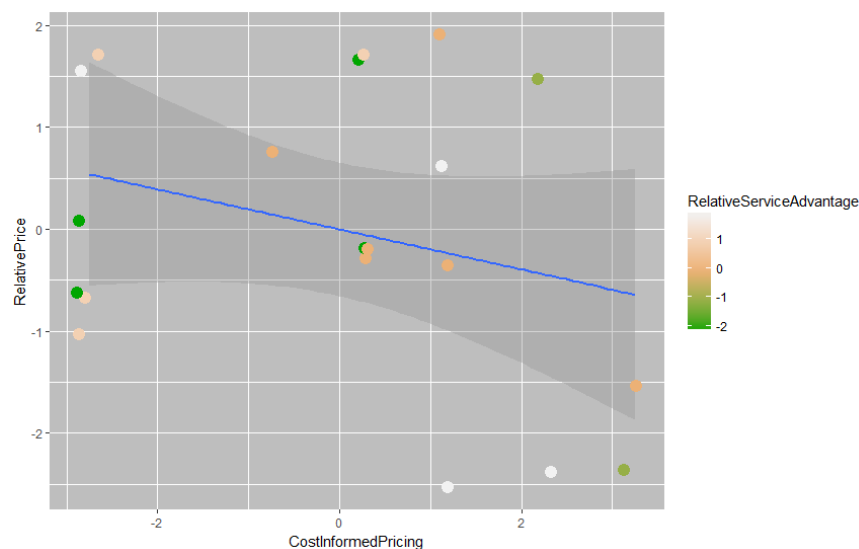


As seen from figure 9, there are four respondents reporting higher use of value-informed pricing than the mean while still reporting a lower relative price even if they report a higher relative service advantage than the mean. This might be a cause of penetration pricing

strategies, as companies could try to push for market share rather than high initial profits if the market potential is large (Dean, 1976; Deeter and Jung, 2013). There is only six observations of companies reporting a lower relative service advantage than the mean. The relationship between these observations is, however, positive. One must be careful not to draw any hasted conclusions from such few observations, since the relationships could be highly influenced by outliers. The promising side is that the variations found in the data can be explained by theory, should the following be true: Value-informed pricing has a positive effect on relative price when relative service advantage is low, but when relative service advantage is high some companies pursue penetration pricing strategies which causes high variance in relative price when value-informed pricing and relative service advantage are high.

The fourth proposition stated that with higher relative service advantage, the negative impact of cost-informed pricing on relative price would increase. Examining a scatterplot of cost-informed pricing on relative price, with color-coding for the moderating variable, it is seen that this effect could be plausible. The relationships can be observed in figure 10.

Figure 10. Effect of Cost-Informed Pricing and Relative Service Advantage on Relative Price.

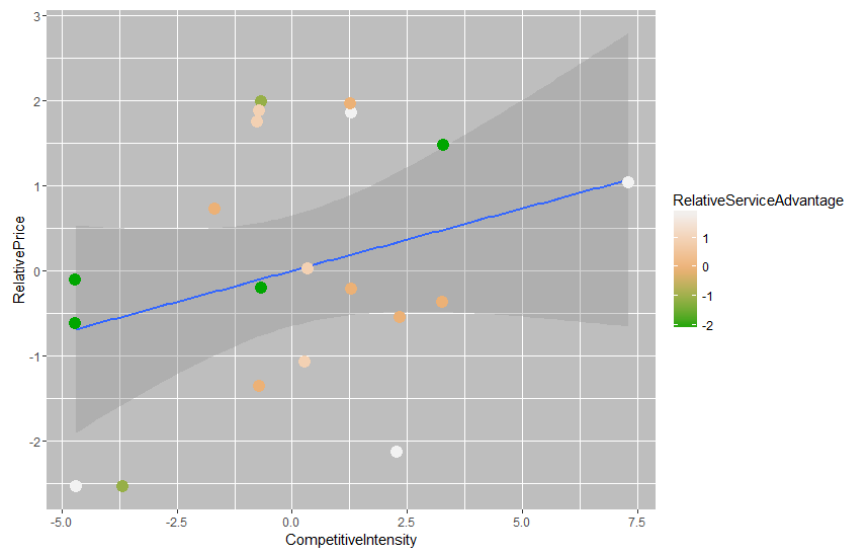


As seen in the scatterplot, by eliminating green points having lower relative service advantage than the mean, there is a negative relationship to be observed, with reservation to the few data points. This might be an indication that the proposition could possibly hold up should a greater sample be collected.

Lastly, the effects of competitive intensity on relative price and market performance were studied. Since the simple effect showed a football-type pattern, it was decided to include

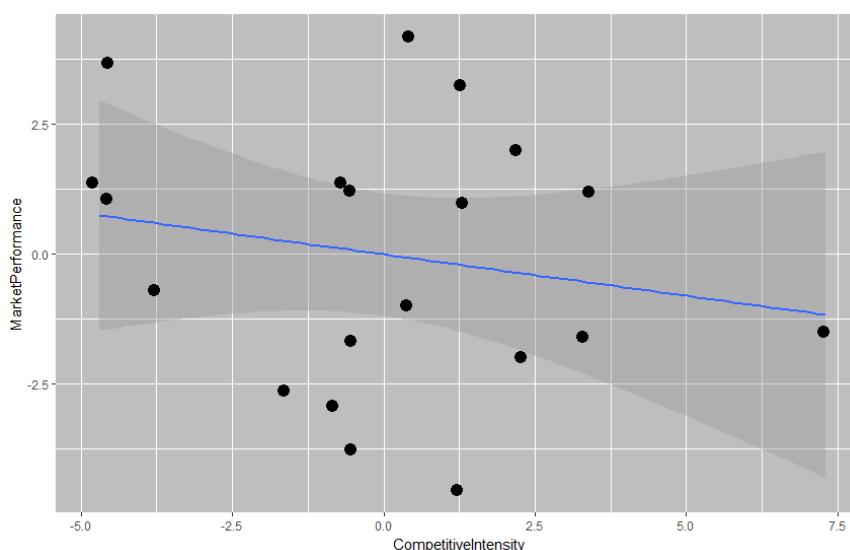
relative service advantage as a moderating variable. This was done to identify if the effect of competitive intensity behaved differently at levels of relative service advantage above or below the mean. The relationships can be studied in figure 11.

Figure 11. Effect of Competitive Intensity on Relative Price.



As seen from figure 11, no meaningful relationships can be identified based on this data. Hence, no indication of competitive intensity affecting relative price is found. However, as seen from figure 12, a negative effect of competitive intensity on market performance could be plausible.

Figure 12. Simple Effect of Competitive Intensity on Market Performance.

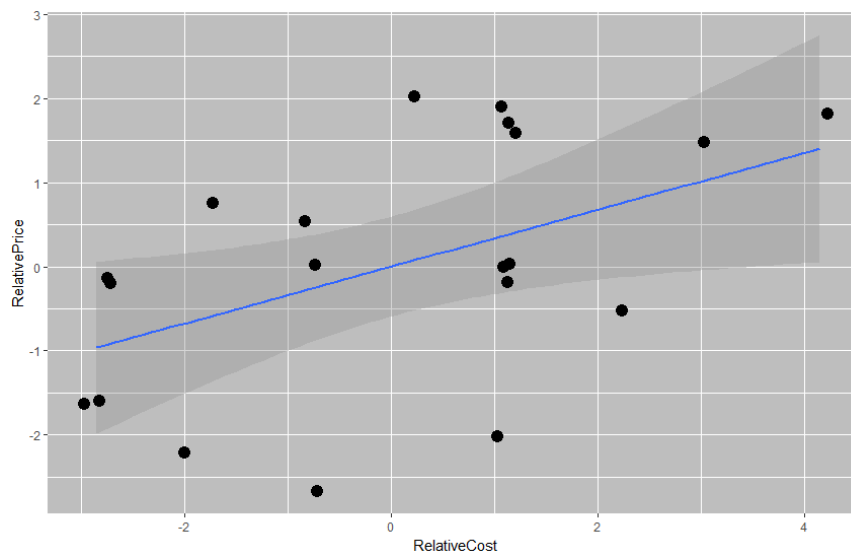


The effect is not clear, and there is an outlier present, but the data shows a behavior that is supported by the literature. Hence, the results look weak, but promising.

6.4 Further Exploratory Findings

Based on what was found during the exploration of the propositions' viability, some further exploration of the data was performed. It seems that the simple effect of relative cost have a significant positive impact on relative price, a single variable regression of relative cost on relative price did indeed render significant results on a 5 % level with a p-value of 0.03 and an estimator strength of 0.34. A scatterplot can be found in figure 13.

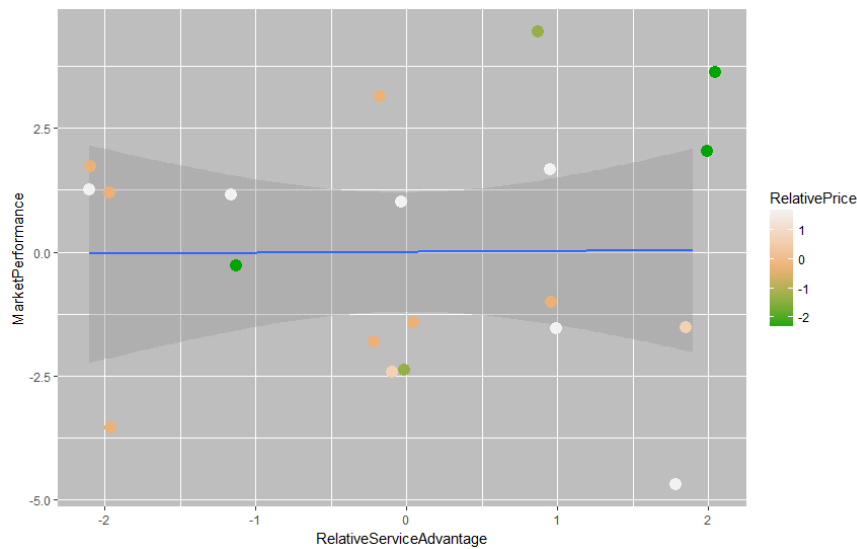
Figure 13. Simple Effect of Relative Cost on Relative Price.



Managers might be tempted to justify their prices based on cost (Foxall, 1972), as it has proven to be seen as a fair reason by consumers (Thaler, 1985). These results then could be an indication that social response bias could be present in the data. Alternatively, since relative cost is the strongest predictor of relative price, managers might put less emphasis on relative price when evaluating new service performance and instead aim for quick market adoption. Then, it could be reasonable that only services with higher relative costs need to charge higher relative prices which could emphasize this relationship.

Since managers have to do a trade-off between market performance and relative price, another analysis was performed with market performance as the dependent variable, relative service advantage as the independent variable and relative price as a moderating variable. Note, that relative service advantage did not show any relevant effects per se. By combining the effects of relative service advantage and relative price, however, there is a moderating effect to be observed. This is illustrated in figure 14.

Figure 14. Effect of Relative Service Advantage and Relative Price on Market Performance.



As can be seen from the plot, there is a positive relationship between relative service advantage and market performance when the relative price is low. With a higher relative price, however, the equation turns on its head and now there is no relationship, or even a negative relationship, between relative service advantage and market performance. This relationship is proved by the moderated regression results below in table 10. This illustrates the issue of overcharging for services, as it effectively can undermine the positive effect of a positively differentiated service. However, one must take into consideration that there is an omitted variable in the form of value transparency. How prominent the company is in communicating their service's differential value to customers should also have an effect on market performance. Indeed, the relative service advantage effect on market performance works as hypothesized when relative price is low.

7 Discussion

There were three research questions stated in the introduction of this thesis. This section will answer these questions explicitly one by one. Thereafter follows sections on managerial implications of the study, suggestions for future research topics and lastly a concluding section discussing the limitations, validity, and reliability of the study.

The first research question was: “What insights for new digital service pricing are there to be gained from the pricing literature?” To answer this question, ten pricing frameworks from 1950 – 2016 and supporting literature were examined. Older frameworks were included to clearly capture effects that stay valid regardless of the distribution channel. These frameworks typically focused on pricing as a part of the marketing mix and as an important tool in the competitive landscape. Later frameworks emphasize the importance of identifying the value created for the customers, and the importance of choosing the pricing model best aligned with how this value is created for the customers. The findings were summarized in a four part model that could assist in new digital service pricing.

Summarized, companies introducing a new digital service should start by careful analysis of how the service creates value for the customers and how usage affects perceived value, so that the appropriate value drivers can be identified. The customer base should then be segmented on these differences in buying motivation. Next, the company should examine its strategic goals and objectives in order to align pricing with these objectives. Important considerations are the identification of a company’s competitive advantage, or the lack of one, and the degree of competitive intensity, total market potential and how transparent the differential value delivered is to the customers. Once these foundations for pricing decisions have been considered, the competitive price range should be identified. It is important to carefully assess competitive reactions at different points in this price range as well as identifying price-volume trade-offs. Lastly, when establishing the final set of prices, firms should take behavioral effects such as perceived fairness into account. Notably, pricing should be planned for the whole life-cycle. For some digital services, this can mean for the foreseeable future, while other services, such as games, can have a more defined life-cycle. When choosing pricing strategy for profit maximization, firms should also plan what pricing tactics they plan on using. Firms should make sure that discounts encourage desirable customer behavior, and not only win sales at a lower price. Different bundling and unbundling options can be experimented with in order to find the optimal service bundle for

the customers. Notably, the pricing function is cross-functional and requires cooperation across business units to succeed. For example, cooperation between pricing and research and development units can lead to services that better serve customers and hence are able to command a higher price. Generally, companies should take a holistic approach to new service pricing and allow information to stream in all directions in order to find value maximizing approaches on a company-wide level. Pricing information such as customers' willingness-to-pay for services and individual features are valuable for several company functions and provide a good base for communication between functions in the same way as company strategy and objectives should be informed to pricing decisions makers.

The second research question was: “How should the conceptual framework by Ingenbleek et al. (2013) be changed to be more suitable for research on digital service pricing?” This question had to be answered in two steps. The first a priori step was based on findings in the literature, while the second step was based on findings in the empirical research. These findings are presented under further research topics. First, a completely new scale for cost-informed pricing was developed based on theory found in the literature. Out of four items included in the survey, two were kept. These were related to the price-necessary for break-even and to the cost of future capacity increases. The scale for relative cost was also modified based on theory found in the literature. First, manufacturing costs were naturally removed. Then, cost of capacity increases was added. After purification, the remaining items were related to total costs and cost of future capacity increases. Lastly, the single item scale for relative price was modified based on expert opinion. The final version of the item included jargon from the gaming industry: “Please indicate your average unique purchase value, or price, relative to your market.”

The third research question was; “What best-practices can be identified?” As a cause of the small sample obtained, no validating statistical testing could be performed in good faith. Hence, only exploratory analysis of proposed effects with support in the literature was performed. Based on this exploratory analysis, it seems plausible that there could be a positive effect of value-informed pricing on market performance, in line with Ingenbleek et al. (2013). Exploring the third proposition, that higher relative service advantage moderates a stronger positive effect of value-informed pricing on relative price, we find an interesting implication for future research. There seems to be increased variance on relative price at high-values of value-informed pricing when relative service advantage is high. It is my belief that this is due to an omitted variable, market potential. Accordingly, the findings were not in

line with the findings by Ingenbleek et al. (2013) for reasons hypothesized above. If the relative service advantage is high, and market potential is high, a company would be wise to consider some form of penetration pricing which would undoubtedly have a negative impact on relative price as per definition. Since digital services companies also often show high gross margins, the price-volume trade-off might also be cheaper for companies in this industry, causing downwards pressure on prices for services with higher market potential. The fourth proposition that the negative impact of cost-informed pricing on relative price would increase as relative service advantage increases seems plausible, with respect to the small sample. This is in line with the findings by Ingenbleek et al. (2013). Competitive intensity looks like it could have a negative impact on market performance, though the relationship is quite weak. At the mean, the variance is much larger making interpretation hard. It also seems that managers might justify their prices disproportionately much from costs, as relative costs have a significant positive impact on relative price. This might be a cause of social response bias, and is something that would need to be addressed in further research. The other option, that relative price is not necessarily the best suited outcome variable, is something that could be solved by including a construct for market potential. Interestingly, there was no significant relationship between relative service advantage and market performance. Relative service advantage has been one of the strongest indicators of market performance historically (Henard and Szymanski, 2001). By including a third dimension relative price, however, a careful positive relationship is found when relative price is low. This is seen as support of the supporting role of relative service advantage on market performance. There are several reasons for why this relationship does not hold when relative price is high. First, there is the price-volume trade-off that naturally decreases the chances of high market performance at higher prices. Second, overestimation of the relative service advantage could cause managers to price their service higher than the customers are willing to pay. This misunderstanding of differential value could also cause management to set goals that are hard to achieve at that particular price level, which would cause the respondents reports of less than expected market performance. Mainly as a cause of the small sample, no clear identification of best-practices can be made. Instead, the findings are used as implications of what future research could be appropriate.

7.1 Managerial Implications

Managers can utilize the model presented in the theoretical section of this thesis as a bullet point checklist to make more informed pricing decisions. As this model is a summary of useful information from ten other options presented, along with supporting literature, it is my belief that this model could be highly useful. Also, the exploratory findings of the best practices show promising, but very careful, results for the positive effects of value-informed pricing. There is also weak support for a negative effect of cost-informed pricing when relative service advantage is high.

7.2 Further Research Topics

For future research, I recommend the inclusion of a market potential construct in the conceptual framework. New digital services with high market potential might strive for swift market adoption, and this would mean that a service with high relative service advantage could show a low relative price. This effect would also be present even if high values of value-informed pricing practices were obtained. This effect is not currently captured by the conceptual framework. It is my belief that this effect is more significant for rapidly scalable digital services than for ordinary products and services. Another effect not currently captured by the conceptual framework by Ingenbleek et al. (2013) is value transparency and how well a company handles this issue through value communication strategies. The proposed effect is naturally that low differential value transparency would have a negative effect on relative price and market performance. Value transparency could possibly be approximated by customer familiarity with the service and the degree to which a service can be identified as an experience good.

It could also be rewarding to rethink the outcome variables. Drawing on the theoretical framework developed, the outcome variable should be total discounted lifetime profits. Since these are unobtainable a priori, or even (as in this case) a year after market launch, some approximation is needed. Are then relative price and market performance as compared to objectives suitable outcome variables as approximation for total discounted lifetime profits? It is my belief that the inclusion of a market potential construct could alleviate the problem. Briefly, total discounted lifetime profits should be dependent on the price itself (or relative price), the total market potential, how fast this potential can be reached and how well it can be maintained, moderated by the service, cost and competition characteristics included as before. It would be most intriguing to see if such an approximation could be created. Lastly,

there seems to be some issues in the definition of “price” as an outcome variable. A step forward was taken in this study, specifying price as the unique average purchase value rather than as a single price, but further steps need to be taken in order to better capture the benefits of pricing tactics and bundling options. It is my belief that these issues are especially important for digital services, as digital services many times can be sold as versions of the same service for different prices. Then, the bundling of features into these service packages becomes a most pressing issue in maximizing profitability.

7.3 Limitations, Validity, and Reliability

As pricing is an extensive cross-functional topic, the research here has had to be severely limited. Topics and issues in the literature review have been explored from a conceptual view from afar. Hence, there is no deep dive into the topics of pricing strategy, pricing models, value-based segmentation, cannibalization, product-service line and bundling tactics and strategies. Notably, several of these limitations severely restrict the research impact specific for digital services.

The empirical part of this thesis is conducted as exploratory research and should be interpreted as such. There are some reliability issues with the thesis, mostly in the form of the small sample the empirical research is based upon. On the other hand, the scales used are all, except for one, based on existing scales, which puts greater trust in the reliability of the study. Notably, all scales show good factor loadings and reliabilities, with the exception of some weakness in the established and unaltered value-informed pricing and relative service advantage scales. As stated before, I suspect there are some validity issues especially in the form of the outcome variables. They might be decent approximations, especially for physical products and services, but I suspect they miss some crucial characteristics of the desirable outcomes for digital services which are more rapidly scalable. The data might be subject to social response bias as shown through the strong relationship between relative cost and relative price. On the other hand, only senior executives were contacted for the survey, which ensures that the data should be well aligned with the true intentions of the company.

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Appendix A: Scale Items

“To what degree were the following factors included in the price-setting process of the new service? In other words, to what extent did you take into account the following elements while determining the price of the new product/service? (1 = was not important at all in price setting, 5 = played a major role in price setting)”

Value-informed pricing

X3. The advantages the new service offers to the customer

X4. The balance between advantages of the service and the possible price (price-quality comparison)

X5. The advantages of the product/service offers, as compared with competitors' services

Competition-informed pricing

X6. The price of competitors' services

X7. The degree of competition on the market

X8. The competitors' current price strategy

X9. The market structure (number and strength of competitors)

Cost-informed pricing

X10. Target return on investment

X11. The price necessary for break-even

X12. The total cost of the service

X13. Costs of future capacity increases

“How do you estimate the relative advantages of this product/service as compared with competitors' products services for... (1 = no relative advantage, 5 = very high advantage)”

Relative Service Advantage

X14. Service quality

X15. Expressing trustworthiness and expertise

X16. Reliability of the service

X17. Overall advantage of the service

“How do you estimate the relative costs of this service as compared with competitors’ services, for... (1 = very low relative costs, 5 = very high relative costs)”

Relative Costs

X18. Marketing costs, including customer acquisition costs

X19. Research and development costs

X20. Total costs

X21. Cost of capacity increases

“Rate the extent to which the following changes occur in the market on which you launched the service... 1 = little to no extent, 5 = to a very high extent”

Competitive Intensity

X22. Changes in services offered by your competitors

X23. Changes in sales strategies by your competitors

X24. Changes in sales promotion / advertising strategies by your competitors

“Rate the extent to which the service has achieved the following outcomes (compared with their predetermined or expected objectives) during the first 12 months after launch of the service... 5= was completely reached, 1 = was not reached at all)”

Market Performance

X25. The degree to which the product satisfies a customer want or need as compared with the objective or expectation

X26. Sales to current customers as compared with the objective or expectation

X27. Sales to new customers as compared with the objective or expectation

X28. Market share as compared with the objective or expectation

X29. Degree to which the product offers a competitive advantage as compared with the objective or expectation

Relative Price

X30. Please indicate your average unique purchase value, or price, relative to your market.